

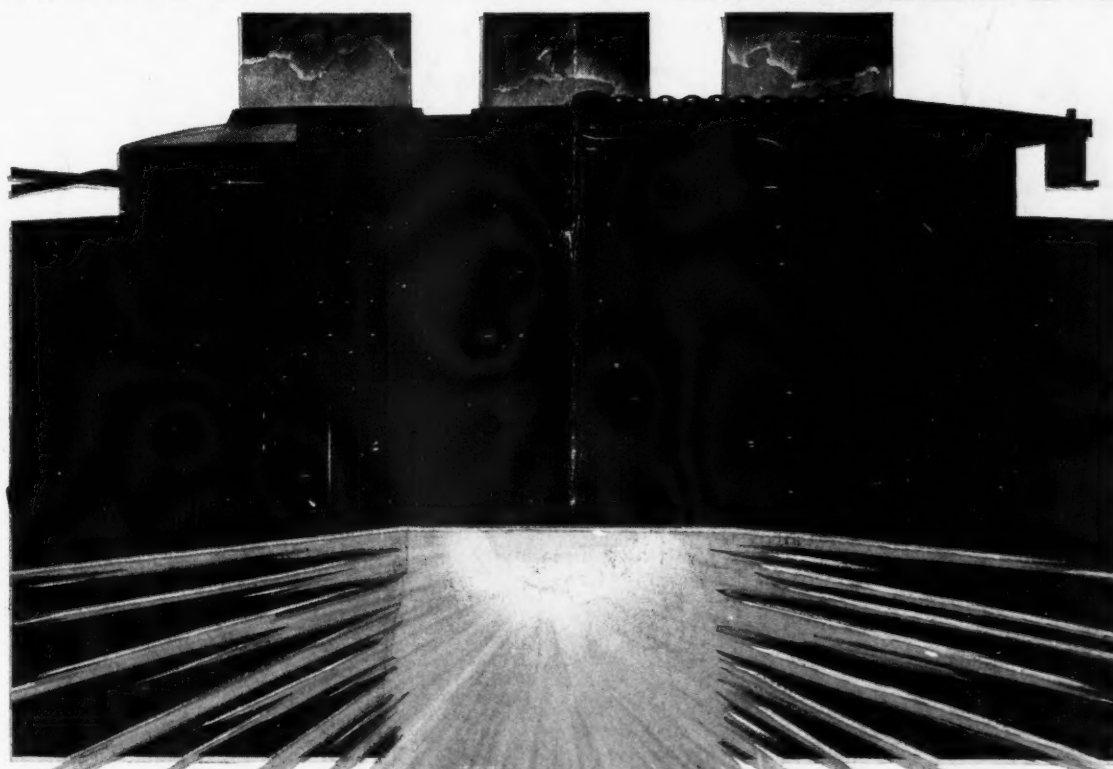
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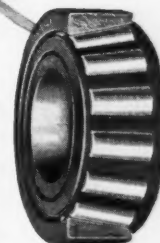
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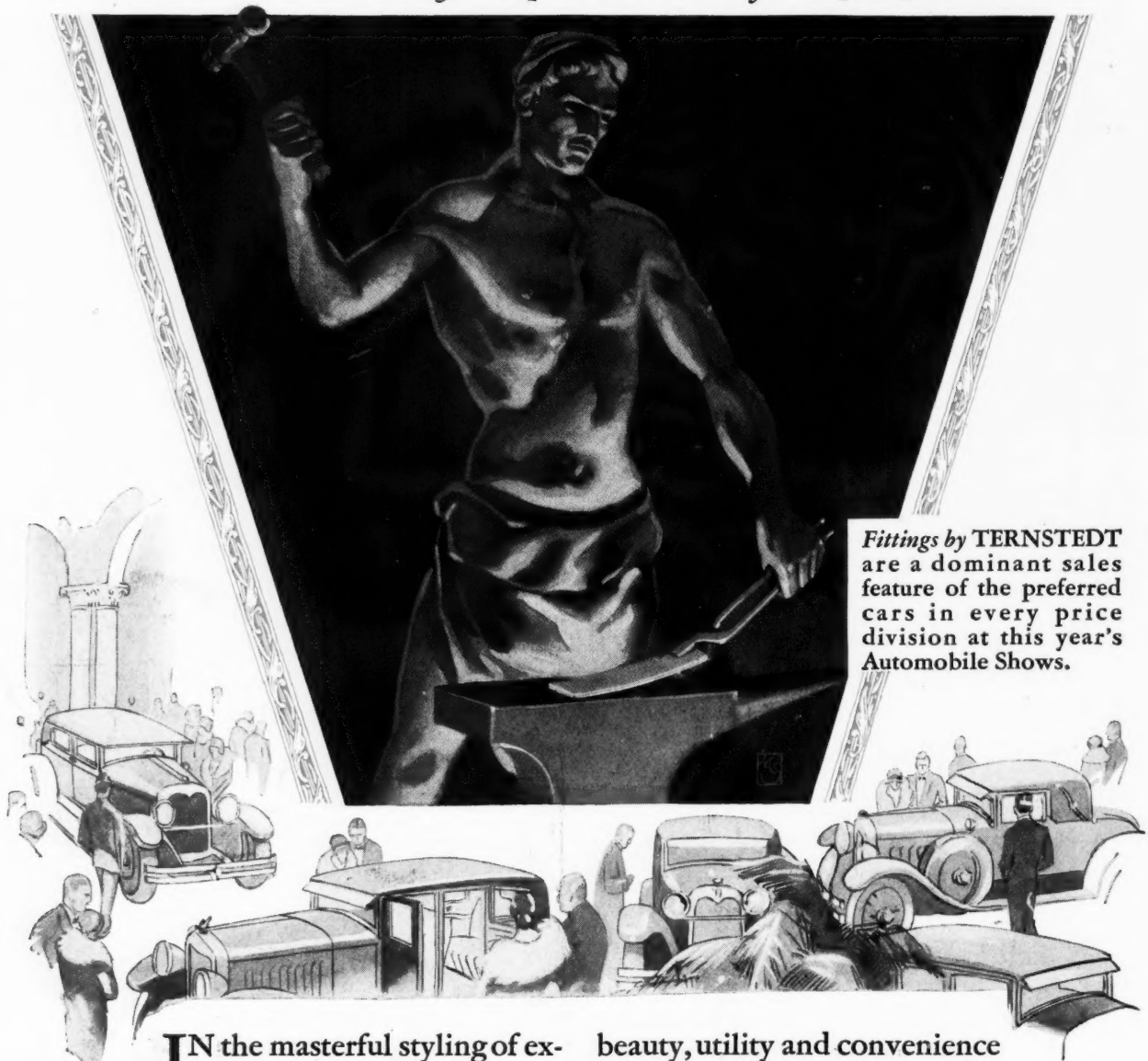
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# AUTOMOTIVE INDUSTRIES

VOLUME 58

Philadelphia, Saturday, February 4, 1928

NUMBER 5

## Tire Simplification Progress Made at S. A. E. Meeting

*Action toward reduction in number of balloon tire sizes  
a feature of annual session in Detroit. Many other  
subjects discussed. Stock-car racing opposed.*

By Lewis C. Dibble

**R**EAL progress toward tire and rim standardization was accomplished at the annual meeting of the Society of Automotive Engineers held in Detroit Jan. 24-27, inclusive. There was also expressed a generally unfavorable attitude by passenger car engineers toward stock-car racing. Use of S.A.E. numbers to indicate viscosity ranges of lubricating oils brought a lively discussion in the Standards Session.

Talks on international air communication possibilities with both Central and South American and Canadian connections were features of the General Session, which was given over largely to the subject of aviation. Papers and discussions at the Production Session were limited to two subjects, "Protective Value of Chromium Plating" and "Machinability and Wear of Cast Iron." The High Speed Diesel Engine Session developed some timely debate as well as considerable information on new Diesel designs.

The meetings were well attended with approximately 1000 persons registered for the various sessions. All business meetings were held in the Book-Cadillac Hotel.

Without doubt the most important session of the entire meeting, from the standpoint of the automotive industry as a whole, was the Tire Simplification Session Wednesday morning. As a result of this meeting it looks as if some progress may actually be made in the matter of simplification of balloon tire sizes. At any rate the session was followed by one of the most important discussions held at any S.A.E. meeting in recent years. A large majority of the quantity passenger car producing companies took part in the discussion, as well as engineers representing the tire and rim branches

of the industry, and all displayed a keen interest.

While a majority of those attending the session were agreed that something ought by all means be done in the matter of standardization, there were a number who objected to the suggested standards which were presented. There resulted a hot argument lasting two hours, which culminated in the taking of a vote, which, while not unanimous, proved that a large majority was in favor of further standardization along the lines suggested. It was still necessary to offer the report of the committee to the session of the Standards Committee for adoption. And, as was expected, this session also brought out considerable discussion, but again those favoring the proposed simplification were victorious, for the proposed measures were opposed by only a few dissenting voices.

The matter of tire and rim simplification is one of the outstanding problems of the industry today, especially in view of the growing number of sizes of balloon tires for original equipment. The condition has meant penalization of the dealer because he has been unable to carry complete stocks of tires of all the various sizes making up the standard equipment of automobiles.

With these facts in mind it is easy to realize the far-reaching and beneficial effects which may accrue to the industry as a whole as a result of the preliminary steps which have been taken by the S.A.E. At any rate future developments along this line will be highly interesting to watch. A meeting of representatives of the N.A.C.C., the S.A.E. and the Rubber Association of America in Chicago this week is the next step in the program.

As was to be expected, the

### Chicago Show Story in This Issue

**I**N addition to a complete report of the 1928 Annual Meeting of the Society of Automotive Engineers, held in Detroit last week, this issue contains a highlight story of the Chicago National Automobile Show which opened Jan. 28.

The Chicago Show story appears on page 172. Other items of interest in connection with the show will be found in the News Section, beginning on page 176.

Stock-Car Contest Session brought out some very interesting arguments and the session developed the fact that stock-car racing is being vigorously questioned by a large number of important passenger car engineers. While the value of certain technical data gathered as a result of competitive racing was admitted by most of the engineers, the consensus was that the same information in various cases could be procured at considerably less cost in other ways. In the opinion of a number of well-known engineers, if such races are to be held cars

should be bought at random from dealers' floors and placed under the supervision of the A.A.A. until the race actually takes place, few if any modifications or adjustments being permitted in the meantime and then only under strict supervision.

The Detroit meeting attracted a very large gathering of engineers and the papers presented at the various sessions brought out some interesting discussions which no doubt will prove highly beneficial to those who attended.

## TIRE SIMPLIFICATION—

# Six Rim Sizes Are Standardized After Warm Debate

*Lengthy arguments over merits of proposals offered by Rubber Association and S.A.E. end in victory for latter.*

By A. F. Denham

THE Tire Simplification Session was an outgrowth of a Detroit Section meeting of the S.A.E. held on Nov. 21, 1927. At this meeting the various phases of the problem were discussed from the angles of the tire manufacturer, the automotive engineer, the dealer and the Department of Commerce. It then became evident that everyone was agreed that something should be done to eliminate some of the balloon tire sizes and check the addition of still further sizes.

From the angle of the Society of Automotive Engineers, the Tire and Rim Division of the Standards Committee set about to procure some kind of an ad-

justment and revision of the present S.A.E. balloon tire standards as listed in the handbook, which have become antiquated due to the rapidly changing situation. The Rubber Association of America, Inc., comprising the tire manufacturers, worked simultaneously along similar lines in cooperation with the National Automobile Chamber of Commerce. The reports of these two organizations formed the basis of discussion of the present session.

Each offered a solution to the problem, but with a difference, for whereas the Rubber Association's "Proposed Balloon Tire Simplification" chart represented chiefly a reduction in the number of casings at present used, the report of the S.A.E. committee attacked the problem from the rim angle. In the latter case, the committee assumed that a reduction in the number of rim sizes and standardization thereon was of primary importance to the automobile owner for it enabled him to use several different sizes of tires in many cases. The "Proposed Revision of Rims for Low-Pressure Tires" offered for consideration for an S.A.E. Recommended Practice, by the Tire and Rim committee, of which H. M. Crane of the General Motors Corp. is chairman, suggested the elimination of all but six rim sizes.

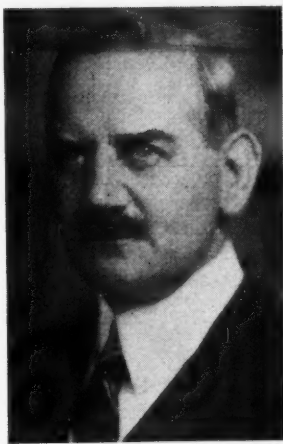
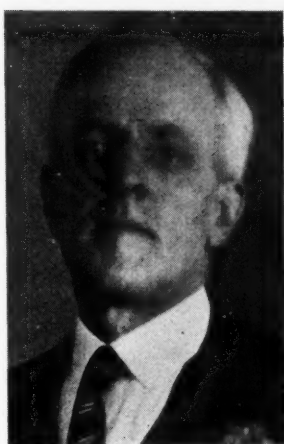
That was where the argument started. Everyone seemed to be agreed that something should be done, but there were plenty who objected to the suggested standards. Naturally any step toward rim or tire simplification had to involve the elimination from the standards of some rims at present used on passenger cars. And while some of the manufacturers expressed their willingness to fall into line and change to different rim sizes, others objected strongly. In fact it was not until a vote was finally taken after more than two hours of heated discussion that it was known whether the attempt to adopt a revised standard would meet with any success. The result of the vote, while certainly not unanimous, proved that a large majority



Photo by Lee F. Redman

Active in the Tire Simplification and other sessions were these S. A. E. members. Left to right—James E. Hale, manager, development department, Firestone Tire & Rubber Co.; Maurice Olley, chief engineer, chassis division, Rolls-Royce of America, Inc., and Walter R. Griswold, engineer in charge of analysis of design, Packard Motor Car Co. Sitting—Col. William Guy Wall, president, S. A. E.





Photos by Lee F. Redman

Left—C. B. Whittelsey, chairman of the Tire Simplification Session. Right—Alfred P. Reeves, general manager of the National Automobile Chamber of Commerce, listened attentively to the discussion of tire and rim sizes

were in favor of recommending the revised standard.

This, however, was not yet the end of the battle, for it was still necessary to offer the report to the session of the Standards Committee for adoption. As was to be expected, this session brought about more discussion, with H. M. Crane, chairman of the committee, and W. R. Strickland of Cadillac, leading the opposing forces. Here again, however, the proponents of simplification won the battle and the Standards Committee as a whole adopted the proposed revision with but a single dissenting vote.

As proposed by the Tire and Rim Committee and adopted by the S.A.E. the report calls for the standardization of the following rim sizes:

Nominal Rim Diameter (in.) (Tire Seat Diameter)	Nominal Rim width (in.)	Width between flanges (in.)	Nominal tire sizes used (1)
21	2.75	Drop center or flat base	30x4.50
18	2.68		28x5.25, 30x6.00
19	2.68		29x5.00, 29x5.50, 31x6.00 *
19	4 1/2	3.125	31x6.00*
20	4 1/2	3.125	32x6.00*
20	5	3.75	32x6.00*, 32x6.75

(1) Tire sizes are not part of this specification, but are given to show the nominal tire sizes used at present on each rim.

\* Note duplication.

In comparing this standard with the proposed reduction in the number of balloon casings recommended by the Rubber Association, it was noted that every tire size listed, except the 32 by 6.75 and 28 by 5.25, was included in the Rubber Association recommendations. The latter, however, includes several more sizes, due chiefly to the retention of 4.75 in. and 6.50 in. tire cross-sections.

Acceptance of the report of the Tire and Rim Committee of the S.A.E. was in no small measure due to the able handling of the session by C. B. Whittelsey, chairman of the session. In opening the session, Mr. Whittelsey called attention to the fact that for original equipment, out of a total of 34 different sizes, 77.4 per cent of the casings sold were in six sizes only during the year ended Oct. 1, 1927. During 1928 there is already a slightly better picture with tire sizes reduced to 24 varieties although the replacement picture is still worse. Replacement sales for the year ended Sept. 30, 1927, were found to furnish a figure of 77.7 per cent of sales in 10 sizes only, covering both balloons and high pressure, there being four of the latter type included. Elimination of the high pressure casings still shows that six sizes provided about 77 per cent

of the country's total balloon tire replacement business.

In commenting on the committee report, Mr. Whittelsey called attention to the fact that the 21 by 2.75 in. rim, carrying the 30 by 4.50 balloon tire size, was retained, although it might be considered outside a specification of this type. He stated that the committee thought it advisable to retain this size for some time due to the fact that it was in use by both Chevrolet and Ford, therefore representing about half the total car production, and could thus not be neglected. Its use, he believed, reflected a large use of low-priced cars in country districts where large road clearances and larger corresponding wheel diameters were still required.

### The 20 by 4 in. Rim

One of the most important points of the recommendations of the committee is in the elimination of the 20 by 4 in. rim. Mr. Crane, in offering the report, stated that a survey indicated that this rim size would probably become obsolete during 1928. Another point emphasized in relation to tire and rim size standardization was that of car appearance as affected by varying wheel and tire proportions. Mr. Crane stated that there was a definite economic reason for the present production by some tire companies of different grades of tires, corresponding to a high mileage tire, a medium tire, and a minimum cost tire of low mileage, especially for the low-priced cars, since the man who purchases a small used car for less than \$100 does not desire to invest a large amount in tires.

Other factors which are involved in tire standardization as opposed to rim standardization is the experience, at least by General Motors, that in the larger cars it may become desirable to use larger tire sizes for the rear wheels than for the front, but that the desirability of such a departure has not yet been determined. Most of the manufacturers who are not using standard tire sizes have relatively low production, according to Mr. Crane, and these will no doubt soon fall into line, when owners realize that they cannot obtain their tire sizes readily when away from home, due to the inability of the tire dealer to tie up the amount of capital necessary to stock up on slow-moving sizes.

Before opening the discussion on the report, Mr. Whittelsey called on James Hale of the Firestone Tire & Rubber Co., who emphasized that any actual steps



Photo by Lee F. Redman

O. E. Hunt (left), chief engineer of the Chevrolet Motor Co., and Walter T. Fishleigh, engineer, Ford Motor Co., snapped at the Tire Simplification Session

to be taken in simplification would have to come from the car manufacturers who, after all, were the guiding factors. The proposed simplification of tire sizes as worked out by the Rubber Association of America was then presented to the meeting by B. J. Lemon of the U. S. Rubber Co. As this chart was to be the subject of a conference between tire and automobile manufacturers in Chicago, it was desired to obtain an opinion from the S.A.E. meeting as representing the engineering end of the automobile industry regarding the proposed elimination of various sizes.

The chart briefly called for simplification to be taken in two steps. The first would call for the elimination of all 21-in. rim tires except the 30 by 4.50 Ford and Chevrolet size, elimination of all 5.25 cross-section sizes, as well as the 6.75 cross-sections, leaving a total of 16 sizes as against 24 used at present. The final step would involve standardization on one wheel size, the 20-in. type, carrying seven cross-sections with varying rim widths. It was also recommended that rim widths between flanges be changed to 0.50-in. steps,

involving an increase in width of the 4-in. rim from 2.68 to 2.75 in., and the 4½-in. rim from 3.125 to 3.25 in.

Both charts were then offered for discussion. Comments were obtained from a large number of the automobile companies.

At this point of the discussion the rim standardization program of the committee was put to a vote with the already mentioned result of the adoption of the report for reference to the Standards Committee, leading to its final adoption. The discussion then continued regarding the proposed Rubber Association program relating to the subject.

A motion was then made by President Col. W. G. Wall of the Society that the Rubber Association proposal be referred to a special committee of the Society for further consideration, in view of the opinions brought out, to enable any desirable additions or possible deletions to be made. The motion was passed unanimously and Chairman Whittelsey appointed a committee composed of all those having varying opinions.

## STOCK-CAR RACING—

# Engineers See But Little Value in Speed Contests

*Majority feel that technical data thus gathered is too costly.  
Stutz to withdraw, says Moskovics.*

By Norman G. Shidle

THE fundamental value of stock car racing was vigorously questioned by a large number of important passenger car company engineers at the Stock-Car Session which nearly 300 members attended on Tuesday afternoon. While the value of certain technical data gathered as a result of competitive racing was admitted by most of the engineers, the consensus at the meeting was that the same information could be and was in many cases being procured at considerably less cost in other ways.

If such races are to be held, such important engineers as T. J. Litle, Jr., H. C. Snow and James Crawford believe the cars should be bought at random from dealers' floors and placed under the supervision of the A.A.A. until the race actually takes place, few, if any modifications or adjustments being permitted in the meantime and then only under strict supervision.



Photo by Lee F. Redman

A. W. S. Herrington, who presided at the Stock-Car Racing Session

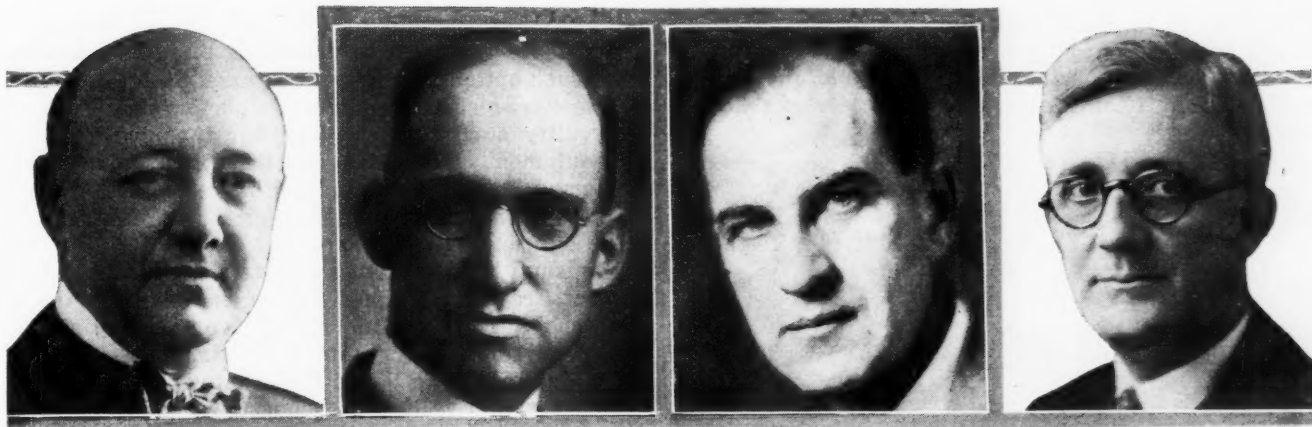
Private certified A.A.A. tests seem to be looked upon with slightly greater favor by a majority of the engineers, but several prominent technical men branded even this form of speed trial as an expensive rather than an economical method of developing technical data about the cars.

F. E. Moskovics, president, Stutz Motor Car Co. of America, on the other hand, put in a vigorous defense of stock-car racing as a means of getting information about weak spots in design and cited numerous instances from the successful year of stock-car racing which his own company has just been through to prove his contention that competitive racing has an engineering value that cannot be obtained from private certified tests or from private runs and experiments of other kinds.

Mr. Moskovics feels so strongly on this particular point, as a matter of fact, that he announced the withdrawal of his company from further stock-car racing in the United States, despite the fact that Stutz won every event in which it participated in 1927, because of his feeling that the A.A.A. does not give sufficiently different recognition to the value of a competitive event as compared to a privately-conducted speed trial.

"While we have learned a great deal from racing," Mr. Moskovics said, "I think we have entered our last stock-car race in the United States, at least for some





They debated the stock-car racing question. Left to right—F. E. Moskovich, president, Stutz Motor Car Co. of America, Inc.; H. C. Snow, chief engineer, Auburn Automobile Co.; J. M. Crawford, Chevrolet Motor Car Co., and T. J. Little, Jr., chief engineer, Marmon Motor Car Co.

time, although we will keep the commitments we have made. Our reason is that the A.A.A. will not recognize the difference between a competitive contest and a record trial; they place the same value on both. As long as they do we are going to take the one where the least chances are involved. We are going to continue in record trials."

Making his point as to the advantages of competitive events, Mr. Moskovich quoted from a letter written by the Earl of Cottenham, a prominent English sportsman, in which the Earl says, "No driver will take the same risks and impose the same strains on all the components of his car while testing as he might do in the heat and excitement of the race."

Emphasizing this viewpoint, Mr. Moskovich continued, "I maintain that there is a vast difference between competitive racing and record trials or private trials. I know of one particular car that made five attempts to get one of the records and didn't succeed. The trouble with these private trials is that they permit mistakes to be buried. When you are racing before a crowd of people you haven't that advantage. Your mistakes are all too clear."

On the whole, however, sentiment at the meeting was not favorable to the continuance of stock-car racing, whether the question was viewed from a commercial or a technical standpoint. D. G. Roos, head of Studebaker's engineering department, voiced a sentiment that seemed to have fairly general approval, when he said that, after all, the matter must be viewed as a business proposition. "It has engineering aspects, to be sure, but there is a great hazard from a business angle in competition with other cars. There is a strong element of luck. . . . Closed trials, on the other hand, may prove very beneficial."

Even on this score, however, Mr. Roos said he felt that most information of this kind can be gathered without going into even this latter type of contest. "I know that before we went down to Atlantic City," he said, referring to Studebaker's recent 25,000-mile run, "we were pretty positive we were going to do what we set out to do because we conducted such vigorous trials at Indianapolis and on our own proving grounds beforehand that we were almost sure of what we would achieve."

"I don't think," Mr. Roos continued, "that there is a chief engineer on the staff of any one of the large corporations who welcomes the idea of stock-car racing. It is true that small concerns have much to gain

and little to lose from this kind of competition. Generally speaking, however, I fail to see where it will be of any great benefit unless we discover on the part of the public an intense interest in it. If there is any demand, I, for one, have failed to detect it. It seems to me it is a sort of hothouse plant we are trying to cultivate which is fraught with a lot of extra work for the engineering end of the business without, so far as I can see, adequate returns."

Paul Dumas, technical editor, *Automobile Trade Journal*, who has had an important part in supervising many stock-car contests as an A.A.A. official, laid the basis for much of the discussion in the paper which he had prepared and which was read by Lewis Dibble at the opening of the session. "No one," Mr. Dumas stated, "who has had a really close, yet disinterested, affiliation with recent stock-car racing can wholeheartedly condemn or conscientiously praise it as an institution."

After outlining the various arguments raised by those favoring stock-car contests and by those opposed to them, Mr. Dumas suggested that, if such racing is to continue, the following points be voted upon and cleared up to clarify the status of what constitutes a stock-car either for competitive races or certified tests:

1. Based on the assumption that a fully-equipped car run on an approved track offers less potential danger to driver

and other contestants than a similar car driven on the highway at similar speeds, shall or shall not the running boards, side and front aprons, windshield assemblies, lamps, top, spare equipment, mud guards, and extending brackets be removed from vehicles contested as "Stock Cars" in competitive events and certified tests?

2. If it is the consensus of opinion that the above appendages may be removed, shall it be permissible or not to in-



D. G. Roos, chief engineer, the Studebaker Corp., had a word to say about racing

stall a sub-windshield or windbreak of some standard specification on contested cars?

3. What permissible machining tolerances on the camshaft cams, expressed in degrees of crank-

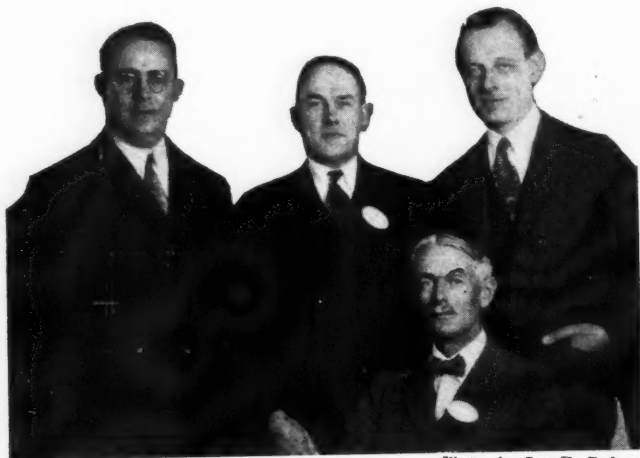


Photo by Leo F. Redman

*Among the attendants at the various sessions were (left to right), A. K. Brumbaugh, of the White Motor Co.; Alfred H. Knight, consulting engineer, Dodge Brothers, Inc.; B. B. Bachman, chief engineer, Autocar Co., and (sitting) Henry M. Crane, technical assistant to the president, General Motors Corp.*

shaft rotation, shall be allowed in the valve timing specifications of contested stock cars?

4. Since wear incurred in a long-distance test or race may affect the valve timing specifications, shall the appointed Technical Committee be compelled to examine each contesting car before the start of the test or contest?

5. In checking the compression ratio of an engine, shall the compression ratio be assumed as the average ratio of all cylinders, or shall the average computed after checking any two cylinders be considered the compression ratio of the engine?

6. What variations or tolerances from the compression ratio indicated in official specifications, or found on a similar model chosen for checking purposes, shall be permissible? These tolerances to be expressed in percentage of the combustion chamber volume.

7. What, if any, shall constitute the regulation method for determining the mechanical compression ratio of an engine?

8. Since it is generally agreed that the all-around 100 per cent efficient spark plug has not as yet been discovered, shall, or shall it not be permissible to install spark plugs of other than the identical model and make supplied as regular equipment on the car as shipped to domestic dealers?

9. What permissible variations as expressed in pounds tension at any given length shall be allowable on valve springs tested after the completion of the event?

10. What procedure should be followed to determine that the tire equipment used on a contesting car is strictly stock?

11. Where parts, equipment, or specifications classed as "optional" are utilized on a contesting car, what evidence should be required to determine whether the use of such optional equipment is bona fide or an attempt at evasion?

12. If in the opinion of the Technical Committee there is reason to doubt the bona fide status of such optional equipment referred to in 11, shall the Technical Committee be empowered to disqualify such contestant or bar the use of such equipment or specifications when it is found that same is or are not available in reasonable quantities from the stock of the distributor or car manufacturer's parts department?

Unusual interest attached to the discussion by James Crawford, formerly chief engineer of Auburn Automobile Co., and now on the engineering staff of the Chevrolet Motor Car Co. Mr. Crawford very frankly voiced the belief that racing is the most expensive rather than the cheapest way of determining engineering characteristics of a car; that racing takes away the attention of the chief engineer from things he ought to be doing back at the factory; that it encourages the incorporation in stock models of features which are of little if any value to the public; that the advertising value is relatively small and chiefly local in character; that the manufacturers have no reason to pay the salaries of race promoters and the overhead of tracks; and that "We in the industry are so close to this matter of stock-car racing that our ideas as to its value are warped." So striking were some of Mr. Crawford's statements that it is planned to publish them in some detail in an early issue.

J. T. Little, Jr., chief engineer, Marmon Motor Car Co., was of the opinion that, while racing probably was an important publicity agent in the early days of the industry, "Today it would not seem that we actually needed this type of publicity, although it has been very successfully used by some advertising departments."

"While I am chairman of the S.A.E. advisory committee and also a member of the contest board of the A.A.A.," Mr. Little said, "I have been openly opposed to the present methods of officially approving the status of stock-car entries. I hold that a stock-car entry should be picked from a showroom floor, preferably by an A.A.A. representative, and the car kept in custody up to the time of the race, but that during this period the contestant be allowed to run the car in up to possibly 1000 miles and that he be allowed to refit it with a high-speed axle, provided such axles were actually optional in production and sold in some considerable quantity."

This same general view as regards picking stock cars was emphasized by David Beecroft, vice-president, Chilton Class Journal Co., who is a member of the A.A.A. contest board. Mr. Beecroft urged that all tests or races be conducted only with cars carrying fenders, windshield and full equipment or that such tests be discontinued altogether. Mr. Beecroft urged that if we are to have such racing and if we are to have rules governing determination of what is a stock car, that these rules be so revised as to make possible an international set of rules. Stock-car racing rules abroad, he pointed out, are far more liberal than in this country; thus the internationalization of rules would be a difficult task, but one which, in Mr. Beecroft's opinion, should be attempted.

Col. W. G. Wall, incoming president of the S.A.E., said that he is not enthusiastic about the future of stock-car racing, but that many things have been found out at Indianapolis which otherwise never would have been discovered.

A. W. Herrington presided over the session.



# HIGH-SPEED DIESEL ENGINES— Results of Recent Development Work Are Outlined

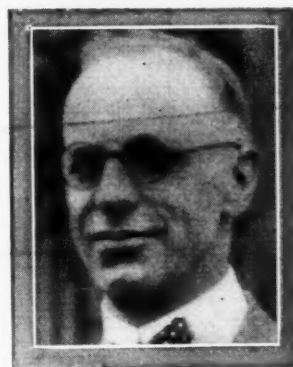
*Progress here and abroad described. Fuel of future likely  
to contain fairly large proportion of residuals*

By P. M. Heldt

THREE papers on high-speed Diesel engines were presented at the Thursday morning session. Prof. Norman of Ohio State University presided. R. J. Broege of the Buda Co. read the major portion of a paper on "High-Speed Automotive Diesel Engines" by Dr. Wilhelm Riehm of the Maschinenfabrik Augsburg-Nurnberg, and then gave brief abstracts from a paper on "Results of Recent American Development Work on the M.A.N. High-Speed Diesel Engine," prepared by himself. O. D. Treiber of the Treiber Diesel Engine Corp., read a paper on "High-Speed Diesel Engines," which was in part devoted to the difficulties attendant upon efforts directed toward obtaining high speed of revolution in this type of engine and partly to a description of the chief features of a 3000 hp. Diesel yacht engine designed and built by the author and which weighs only 20 lb. p. hp. A fourth paper scheduled on the program, "The Development of the Maybach High-Speed Engine," by F. W. von Meister, was not read.

DR. RIEHM in his paper pointed out that, according to recent researches by Taube and Schulte, the ignition temperature of engine fuels decreases with increasing pressure. The ignition temperature of gas oil, for instance, decreases from 520 deg. Fahr. at 8 atmospheres absolute to 390 deg. Fahr. at 30 atm.; that of gasoline from 620 deg. Fahr. at 8 atm. to 510 deg. Fahr. at 30 atm.; that of coal-tar oil from 980 deg. Fahr. at 10 atm. to 710 deg. Fahr. at 30 atm. and that of benzol from 1100 deg. Fahr. at 10 atm. to 875 deg. Fahr. at 30 atm. The ignition points for heavy oil at comparatively high pressure are below the end points of the fuel, hence complete vaporization below the ignition point is impossible.

With the Diesel cycle the compression and ignition temperatures are necessarily higher, and this involves increased stresses on working parts. Figur-



Prof. C. A. Norman,  
who presided at the  
Diesel engine session

ing with a maximum pressure increase of 50 per cent, Dr. Riehm showed that crankshaft weight need not be increased more than 4-5 per cent, the cylinders, heads, pistons and crankcase need not be made heavier at all, because on account of foundry limitations they are always stronger than necessary, and the total weight increase need not exceed 10 to 15 per cent as compared with the carburetor engine.

On the whole the Diesel engine hardly falls below the carburetor engine in driving torque. Dr. Riehm thinks that the upper speed limit of 2000 r.p.m. required for truck engines can be reached without difficulty by Diesel engines, hence a Diesel engine may give the same power as a carburetor engine of the same displacement but will weigh 10-15 per cent more.

Referring to the air-injection system, Dr. Riehm said it is not so well suited to small units, still one type of air injection engine developed in Germany has proved successful in various applications, particularly in rail-car work.

With the ante-chamber system the compression is usually carried at about 450 lb. and the ignition pressure is 600 lb. p. sq. in. The excess pressure produced on ignition in the ante-chamber forces the remaining fuel through small orifices into the cylinder, where it burns.

With direct atomization higher pressures must be maintained in the fuel line, about 4500 lb. p. sq. in., as compared with 1500 lb. for the ante-chamber system. Experience has

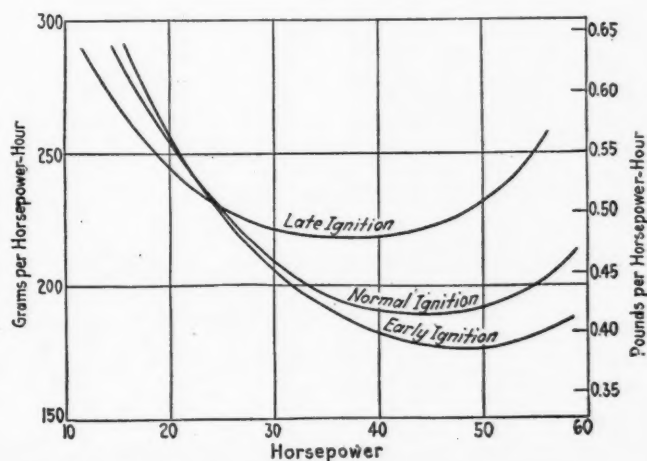


Fig. 1. Relation between horsepower and specific fuel consumption for different injection timings

shown, however, that the production of reliable fuel pumps to work against the higher pressure involves no serious difficulty.

With the ante-chamber system the period of injection must be very accurately timed with relation to the piston motion, and this necessitates the use in the

eral years' experience with this type engine, which was built in both four and six-cylinder types, the M.A.N. firm brought out a new design of 120 instead of 110 mm. bore and the same stroke of 180 mm. The four-cylinder model of the new 4.72 by 7.09 in. engine has five crankshaft bearings and the six-cylinder model, seven. All parts are more rigid and speeds up to 1500 r.p.m. are permissible. Cylinders are cast in pairs and a single camshaft is used.

#### Larger Engine Also Built

A larger 6.50 by 8.66 in. engine for rail-car, industrial locomotives, industrial power unit and marine purposes is built in both four and six-cylinder models developing 120 and 180 hp. respectively at 1000 r.p.m. In this latter the crankcase casting (iron) extends up to the cylinder heads and removable liners are used. The two new models have plain main bearings, whereas the old engine had roller main bearings. Still larger engines with 50 and 100 hp. per cylinder at 700 r.p.m. are now in process of design.

The effects of ignition timing on specific fuel consumption is brought out in Fig. 1 herewith. The three ignition timings there represented all give maximum pressures of 630 lb. p. sq. in. at certain given speeds—the late ignition at 500 r.p.m., the normal at 1000 r.p.m. and the early at 1400 r.p.m. However, if the early ignition were used at all speeds it would give an ignition pressure of 780 lb. p. sq. in. at 500 r.p.m. This shows the importance of variable timing of the injection when the engine is used on vehicles in large cities. A very light gas oil with an end point not exceeding 608 deg. Fahr. is used to prevent objectionable smoke and odor during idling periods or owing to improper pump or injector adjustment.

In comparative tests with 5-ton trucks equipped with carburetor and M.A.N. Diesel engines respectively, each hauling a 5-ton trailer, the fuel consumption of the Diesel engine truck under various operating conditions ranged from 62 to 66.5 per cent of that of the carburetor engine truck. The torque curve of the

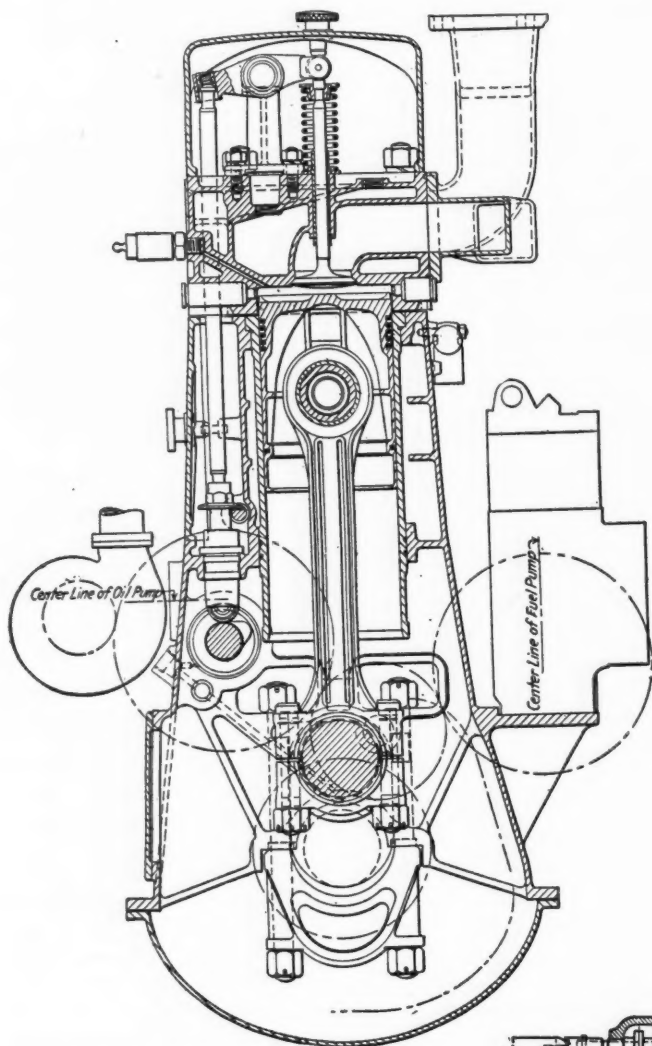


Fig. 2—Cross section of new design of M.A.N. Diesel truck engine

injection nozzle of a spring-loaded valve actuated by the pressure on the fuel—a rather expensive and delicate part. Direct injection does away with this valve, employing an open nozzle.

Another advantage of direct injection is that engines working on this principle will start without special provisions, by simple turning the engine over either by hand or other means, whereas all ante-chamber type engines have auxiliary ignition devices, such as impregnated paper cartridges, electric coils or the like.

Dr. Riehm next described the M.A.N. Diesel truck engine, which has been described previously in *Automotive Industries*. After sev-

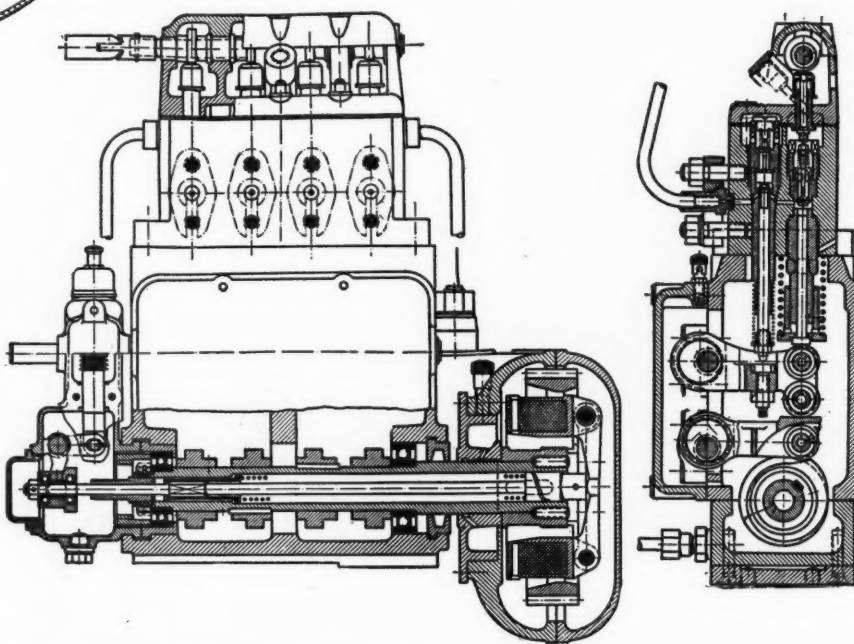


Fig. 3—M.A.N. fuel pump and governor, side elevation partly in section, and cross section



Diesel engine, which shows continued increase in torque with decrease in speed, insures great flexibility of operation.

"There are two other possibilities," concluded Dr. Riehm, "that so far have been closed partly to the carburetor engine, namely, supercharging in four-stroke engines and the use of the two-stroke cycle. Developments along these two lines, which promise substantial power increases, can be utilized to best advantage in the Diesel engine because only clean air is used for filling or scavenging the working cylinders. The next few years unquestionably will bring substantial progress in these directions, and they will make the distinctive properties of the Diesel engine a factor in the light high-speed engine field."

## The Automotive Full Diesel Engine

MR. BROEGE, in his paper on The Automotive Full Diesel Engine, first described the M.A.N. Diesel-type truck engine which was illustrated and described in *Automotive Industries* of March 25, 1926. The Buda Company has the American M.A.N. rights. One of the truck engines imported from Germany was installed in a 4-ton truck of American make and was operated alongside of another similar truck with the conventional gasoline engine. It was found that it required no more effort to learn to drive the Diesel-engine truck than to learn to drive a gasoline engine truck. A material saving on fuel was effected, and it was also found that the radiator, which had been designed to cool a gasoline engine of somewhat less displacement, was of more than ample capacity for the Diesel engine.

In the second part of his paper, Mr. Broege described an engine of 6-in. bore and 8-in. stroke built by the Buda Co. on M.A.N. lines. Crankcase and cylinder housing are of boxed construction, with inserted cylinder sleeves of gray iron. The crankshaft main bearings are babbitted and there is one bearing between each pair of adjacent cylinders. The lower part of the crankcase or oil pan is of aluminum, its light weight making it easier to drop it for bearing adjustment. Pistons and connecting rods can be withdrawn from either the top or the bottom, and there are handholes in the side of the crankcase for connecting rod bearing adjustment.

Starting can be effected either by means of an electric starter or by means of a double-cylinder opposed, air-cooled gasoline engine, the drive in either case being to a steel ring gear on the flywheel. To facilitate starting, the compression in all but one cylinder can be relieved by hand; when firing begins in the cylinder in which the compression is normal the compression control valves on the other cylinders are closed and all of the cylinders then pick up their regular cycle.

Cylinder heads are cast in pairs, for convenience in handling, and are provided with safety valves. An integral deflector is formed on the head of the inlet valve, which, in conjunction with the tangential direction of the fuel spray, is said to produce sufficient turbulence to insure clean combustion. The air inlet pipe has a pre-heater attached for use in starting in extremely cold weather.

Lubrication of all moving parts is by the so-called dry sump system, a dual gear pump being fitted, of which one section draws oil from a supply tank on the flywheel

housing and forces it to all of the points to be lubricated, including the piston pins and the timing gears, while the other section returns the oil that collects at the bottom of the sump to the supply tank. Direct mechanical feed to the cylinder walls also has been provided for, and can be had if desired.

Careful consideration has been given to accessibility of all working parts for ease of inspection and servicing. The integral crankcase and cylinder-housing with walls between cylinders from top to bottom gives a very rigid construction and permits of the use of much thinner sections, which tends to decrease the weight.

The fuel-pump is mounted on a bracket integral with the crankcase and is driven off the timing-gear train. It is a cam-actuated plunger type with a plunger and a cut-off valve for each engine cylinder. The cut-off valve and plunger are actuated by fulcrum tappets interposed between the main-drive cams and the plunger and cut-off valve. The cut-off valve can be adjusted the same as ordinary valve-tappets. All moving parts are inclosed in a common housing and operated by one driveshaft having integral drive-cams.

The engine-speed is controlled by the governor, which is built into the fuel-pump and operates the cut-off valves. These valves can also be controlled manually if desired. The speed of the engine is increased or decreased by varying the point of the fuel cut-off and the duration of injection. These are the only controls used in operating the engine, and they correspond very closely to the spark and throttle control of the gasoline engine. The proper position for the fuel-injection-advance lever for a wide range of speeds can be readily determined, and the engine can then be controlled by the fuel cut-off lever alone, the same as a gasoline engine is controlled by the throttle lever.

The fuel nozzles have a single opening and remain open permanently, having no valve. All of them are interchangeable. They can be removed for cleaning as easily as spark plugs and require cleaning no oftener, as the fuel, before entering the pump, is filtered through a fine-mesh screen.

An engine of this design has been tested at Armour Institute of Technology in comparison with a gasoline engine of the same cylinder dimensions, and the results are shown in Fig. 1. Tests were made with three different grades of fuel differing widely in their characteristics. Analyses of these fuels are given in Table 1. The engine burned all of these fuels equally



Photo by Lee F. Redman

R. J. Broege

Table 1

	Test Fuel		
	No. 1	No. 2	No. 3
Specific Gravity, deg. Baume at 60 deg. Fahr. ....	38.2	34.3	26.0
Carbon Content by the Conradson Test, per cent .....	0.006	0.03	2.57
Flash Point by the Pensky-Martin Closed-Cup Test, deg. Fahr. ....	160	225	200
Water and Sediment, per cent .....	0.06	0.10	0.10
Heat Units per Pound, B. T. U. ....	19,675	19,590	19,234
Sulphur Content, per cent .....	0.31	0.63	0.78

well in all tests, which indicates the wide choice of fuels open to the owner of such an engine.

As compared with gasoline engines the following advantages are claimed for this engine:

- (1) It derives its fuel from the largest supply of the cheaper and non-volatile hydrocarbons.
- (2) Has a lower fuel-consumption per horsepower-hour, and especially so under variable load-conditions.
- (3) The automatic ignition eliminates accessories and drives such as are required for magneto or distributors, which results in greater reliability.
- (4) It simplifies or eliminates possible difficulties which might arise from additional and complicated equipment.

## Describes 3000 Hp. 12-Cylinder Diesel

**O.** D. TREIBER of the Treiber Diesel Engine Corp. of Camden, N. J., described a 3000 hp. 12-cylinder marine-type Diesel engine of his design which has been built by the company bearing his name. The engine is designed on automobile engine lines, making use of high tensile and light alloys instead of the materials commonly used in Diesel engine construction. The framework is of cast steel, cylinder liners are of forged steel, the cylinder heads and the pistons are of aluminum alloy. There are twelve 16 by 16 in. cylinders, and the engine turns over at 700 r.p.m. and weighs 58,000 lb. or less than 20 lb. per hp.

Mr. Treiber said that 80 lb. p. sq. in. is about the limit of m.e.p. which it has been possible to obtain in Diesel engines so far; this is considerably less than the m.e.p. of modern carburetor-type engines, and he ascribes the difference to the lower effective expansion ratio in the Diesel engine, most of the fuel entering the cylinder only after the expansion stroke has begun.

According to the author, the speed at which Diesel engines can be operated is limited by two factors. In the first place, owing to various contingencies, it is possible to obtain pressures as high as 1850 lb. p. sq. in. in the cylinders, and these must be provided against, which means that the whole structure and the reciprocating parts must be comparatively heavy. Then there is the time-lag in the combustion. Not only must the fuel be converted from a liquid into a gaseous state within the combustion chamber, and be sprayed or atomized at a constant high velocity, but injection must be started and stopped very suddenly.

Fuel may be injected either directly into the combustion chamber or it may be injected into a sub-chamber. The latter method is very alluring to the designer, but it precludes high mean effective pressures and high economy. There are three different methods of direct injection into the main combustion chamber, as follows:

1. Injection of a measured quantity of fuel by a timed plunger pump through one or more orifices.
2. Automatic injection, such as that of the Hvid system.
3. Maintaining the fuel oil at a constant pressure directly above the spray nozzle orifice and controlling the fuel flow by a mechanically-operated valve seated in the nozzle above the orifices.

Of this latter system the author says: "High starting-velocity and a quick cut-off can be obtained by this method, which assures the maximum efficiency of this important function. As the oil is maintained at a constant high pressure just above the spray orifices, it can be brought to a very high temperature before being admitted into the combustion chamber without being decomposed. This aids it in rapidly atomizing and uniting with the oxygen."

In the discussion, J. H. Geisse, chief engineer of the aeronautical engine laboratory, Naval Aircraft Factory, Philadelphia, said he had made some calculations concerning the relation between maximum and mean effective pressures for Diesel and carburetor-type engines, and for a maximum pressure of 550 lb. p. sq. in. the carburetor-type engine would give a m.e.p. of 125 lb. p. sq. in., while for the same maximum pressure the Diesel engine would give a m.e.p. of 145 lb., these figures being arrived at by using the exponents usually employed in explosion engine calculations. On the other hand, a fuel consumption figure of 0.44 lb. p. hp.-hr. had been reached in air-cooled aircraft engines, which set a mark which the Diesel engine would have to better in aeronautical work.

J. E. Wild of the Robert Bosch Magneto Co., Inc., said he had found that, owing to the high thermal efficiency of the Diesel engine, a smaller radiator would suffice for that engine in a given class of work. In their experience with a standard truck they had been

compelled to cover up part of the radiator even in normal temperatures. Dr. Riehm in his paper had raised some objections to spring-loaded injection valves, but as used by the speaker's firm these valves had proved entirely satisfactory. The use of such valves made it possible to locate the fuel pump wherever it was most convenient. Con-

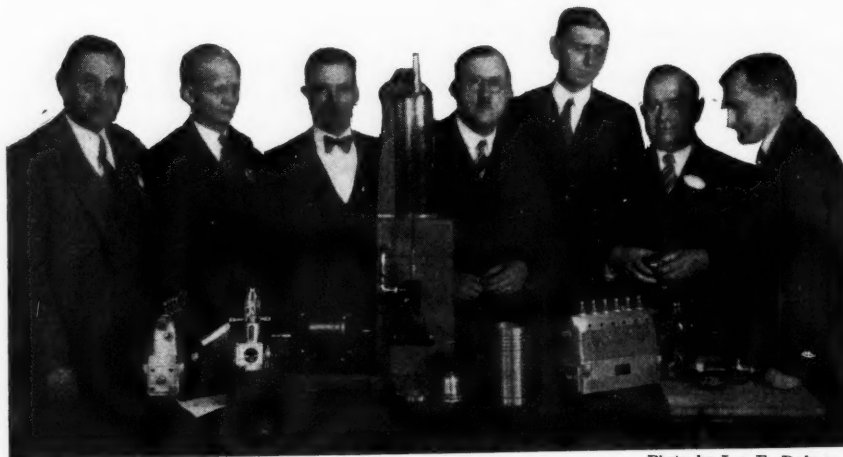


Photo by Lee F. Redman

Here we have an interested group gathered about the display of the Robert Bosch Magneto Co. Among those in the picture are: L. C. Carlton, C. Straub, H. L. Horning, Vincent G. Apple, Louis Beeh and A. J. Poole



siderable emphasis had been laid on the need for advancing the injection period with an increase in speed, but with the new Bosch system this advance had been found unnecessary. As to the economy of the Diesel engine, a 5-ton truck when operated in New York City traffic had consumed 1 gal. per 10 miles, while in a 1200-mile run of this same 5-ton truck, carrying a load of 2 tons, the consumption had been at the rate of 1 gal. per 11.6 miles. The better economy of the Diesel engine showed up particularly at light loads. The fuel consumption of the Diesel truck engine was at the rate of 0.45 lb. p. hp.-hr., and the engine was so flexible that there

was no danger of getting stuck in even the most congested traffic.

A representative from one of the oil companies gave some light on the Diesel fuel situation. He said the fuel all manufacturers of Diesel engines liked to have was a light gas oil, but they were not likely to get that at a very low price, because this oil was easily cracked into gasoline, and the refiners naturally preferred to sell at the higher price of the gasoline if the demand warranted the cracking. What Diesel engine users would eventually have to take was an oil containing a fairly large proportion of residuals.

## PRODUCTION SESSION—

# Hardness of Cast Iron no Index to Machinability

*Neither does it indicate wearability, says T. H. Wickenden.  
Chromium plating subject of Baker-Pinner paper.*

PAPERS and discussion at the Production Session were limited to two subjects, the first covering "Machinability and Wear of Cast Iron" and the second the "Protective Value of Chromium Plating." In the first paper, presented by Thomas H. Wickenden of the International Nickel Co., data were given to show that the hardness and chemical composition of cast iron in themselves provided no indication of the wear and machinability of the metal.

The second paper, prepared jointly by Prof. E. M. Baker of the University of Michigan and W. L. Pinner of the C. G. Spring and Bumper Co., provided test data tending to show that chromium plating in itself has little protective value against corrosion, its value depending largely on the protection afforded the plated piece by the underlying coatings.

Mr. Wickenden's paper in general tended to show the following facts:

1. Irons containing free ferrite in large amounts wear rapidly.
2. Irons having considerable pearlite or sorbite in their structure show good wear.
3. Free carbide or phosphide spots are deleterious.

The paper in general recommended the use of nickel, or of nickel and chromium, as a means of obtaining the correct microstructure. Nickel is said to have the characteristic of eliminating free carbide spots and forming sorbite instead of pearlite, giving greater hardness. Addition of chromium increases the amount of combined carbon, a desirable feature, but if it is used in too large quantities it will produce areas of free carbides. By using both elements together the best results are obtained.

In the discussion which followed various methods of measuring machinability were discussed, following a question on this subject by Prof. Boston of the University of Michigan, who also wanted to know just what was meant by machinability and its relation to

wearing qualities. Mr. Wickenden in reply stated that the two factors, were closely inter-related, and that his interpretation of machinability was a condition of tool life. A good finish on the machined surface increases wearing qualities.

L. A. Danse, of the Cadillac Motor Car Co., suggested the necessity of developing a standard machinability test as a function for the S.A.E. to perform. As far as General Motors is concerned, Mr. Danse stated, a machinability test is performed by means of a standard shaper, using a standard tool, and standard test piece, measuring the input to the motor by a watt-hour meter. Mr. Danse took issue with the statement that machinability and wear were closely inter-related, stating that the latter quality depended entirely on lubrication. With good lubrication it is not necessary to worry about poor microstructure of the iron according to Mr. Danse. He did state, however, that the obtaining of a uniform iron structure was important.

The Bullard Machine Co., according to E. P. Blanchard, performs machinability tests in addition to tensile and hardness tests. The method is to use a standard drill press under standardized conditions, measuring the time required to drill through a certain thickness. Mr. Blanchard agreed with Mr. Wickenden that the addition of nickel produces a more uniform cast iron without decreasing its machinability.

F. J. Hooven of the Massachusetts Institute of Technology questioned whether anyone got really good enough lubrication to neglect structure of the iron, to which Mr. Danse replied that there is very little wear under normal running condition except when abrasives, such as road dust, are present. Mr. Danse also agreed that nickel gave iron a better uniformity and closer grain.

Prof. Boston stated that they also use a shaper for measuring machinability but have found a standard planer much more satisfactory, measurement of ma-

chinability being by measuring the cutting force under standard conditions. According to Prof. Boston, the next best method would be by measuring the life of a standard boring tool but that this method would require too much material and take too much time to be practical for laboratory investigations. A drill press is also used at the University, he stated, measuring the torque and thrust independently, results from which checked very closely with results obtained from the planer test as far as comparisons are concerned on various materials.

A question was asked by W. S. Howard of White Motor Co., regarding whether nickel should be added at the spout or in the cupola, to which Mr. Wickenden replied that if properly done it made no real difference. Mr. Danse further amplified this by stating that if the shot is too large poor diffusion often results, and that he considered addition of nickel to the ladle best.

## Soft Iron May Wear Better Than Hard

**F**OLLOWING is an abstract of Mr. Wickenden's paper:

Numerous examples have been cited in which a soft iron has shown better wearing qualities than a hard iron under certain conditions. Hardness alone is not a true index of wearing quality. This is due to varying micro-constituents. Graphite is soft, pearlite is similar to spring steel, sorbite like heat-treated steel, phosphides give brittleness, free carbides are like the hardness of tool steels.

Of these, graphite is too soft in itself to give good wear, but holds oil. Ferride abrades easily, etc. While white iron (carbides) give good wear, it is almost impossible to machine. A good wearing iron that is readily machinable should have:

1. Presence of well-distributed primary graphite.
2. Sufficient combined carbon to make matrix largely pearlitic or better, sorbitic, in structure.
3. Absence of free carbide and phosphide particles.

With these conditions met, increased hardness means better wear. Addition of nickel will eliminate free carbide while increasing hardness by forming sorbite instead of pearlite. Addition of chromium in increasing quantities tends to produce increasing amount of combined carbon; in excess, free carbides will be present. Three parts of nickel to one of chromium is a good combination. If casting has corners or edges that tend to chill, nickel-chromium ratio should be five to one. Slowly cooled castings are often better with two to one nickel and chromium.

## Chromium Plating Limitations Shown

**A** FEATURE of the joint paper by Messrs. Baker and Pinner was that instead of pointing out the value of chrome plating an attempt was made to establish its limitations.

Most of the paper was taken up by tables of test data results, using 1095 and 1010 S.A.E. steels, plated with metallic chromium from a chromic acid bath at 100 amp. per sq. ft. Variations used for each test group included varying the thickness and methods of

coating with nickel base alone, over "cyanide" copper alone, and over various combinations of alternating nickel and copper plates.

### Two Methods of Test

Two methods of test, the ferricyanide and salt spray, were used. Tests were conducted until clearly visible rust spots were produced. All specimens nickel or copper plated were buffed immediately before chrome plating.

Regarding the test results, the paper states: "In general the ferricyanide test shows that improved protective value is obtained by chromium plating. The results are less erratic and improvement is more uniformly obtained when the thickness of chromium lies between 250 and 600, although much depends upon the quality and nature of the underlying deposits." Tests showed that chromium-plating over cyanide copper gave poor test results unless the chromium is greater than that obtained with 1000 amp. min. per sq. ft. This is thought to be due to solvent action of chromium on the copper.

The tests clearly indicated that the protective value of chromium depended largely on the type of undercoating. Best results were obtained with a base coating of 200 nickel, 300 copper and 400 nickel (figures refer to amp. min. per sq. ft.).

As a summary the paper states that the protective value of chromium depends practically entirely on the skill with which it is used.

In the discussion which followed several suggestions were made for further amplification of the data

*Seen at a number of the sessions was W. W. Nichols, vice-president, mechanical engineer, D. P. Brown & Co., Detroit. Mr. Nichols has just succeeded to the presidency of the Detroit chapter, Society of Industrial Engineers, succeeding C. V. Carpenter, who died recently*

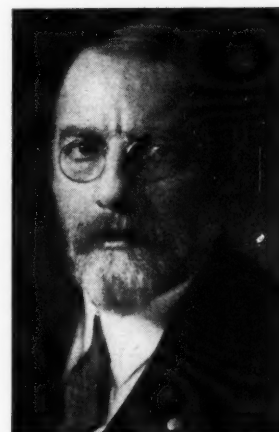


Photo by Lee F. Redman

already given. Mr. Sherry suggested that brass plating might be found to give better results than copper, and also added that actual weathering tests might be of value. Prof. Baker replied to the latter that this type of test was necessarily slow and also that it did not offer any good basis of comparison since there is no "standard weather."

Regarding chromium plating as a wear resistant, W. M. Phillips of the General Motors Corp. stated that it has given from five to 10 times longer life for plug gages, but that it has not been found suitable for cutting edges under high pressure.

Questioned by E. P. Blanchard regarding the advantage of chrome plating on running bearings, Mr. Phillips stated that they had met with some success, but that chrome plating does not replace carburizing, unless the bearings are subjected to very light loads. Mr. Phillips also stated in regard to other questions that about 1500 fan shafts and 25,000 piston pins per day were now being chromium plated.



## RESEARCH SESSION—

# Anti-Knock Experimenters "Don't Speak Same Language"

*Use of different methods by fuel experts has resulted in much of the benefit of their work being lost.*

**B**OTH the morning and afternoon sessions on Thursday were devoted to research topics, the morning activities bearing entirely on fuel research. As a result of work done at the Bureau of Standards and at industrial and institutional laboratories during the past two years it is now becoming evident that from the consumer's standpoint there are two characteristics of motor fuel which overshadow all others in importance. These are the volatility and the anti-knock value.

As a test of volatility the A.S.T.M. distillation test has been available for years, but many consumers were of the opinion that its results were not really what they wanted—that they gave no reliable indication of the facility of turning the fuel into a gas when mixed with air and burning it in an engine. These doubts now seem to have been set at rest by an investigation conducted by O. C. Bridgeman at the Bureau of Standards and dealt with in a paper presented at the morning session. Mr. Bridgeman's investigation showed that the A.S.T.M. test actually is a true test of volatility.

The three other papers of the morning session all related to the subject of detonation and particularly to methods of measuring it. Ever since Ricardo introduced his toluol number scale for anti-knock value there has been a great deal of experimentation with fuels with regard to their freedom from detonating qualities, and methods have gradually drifted further apart. It is now coming to be realized that much of the possible benefit of this research work is being lost because the experimenters have no means of interpreting each other's results. As one of the speakers at the session put it, "They do not speak a common language." The papers embodied two surveys made to see whether this state of affairs could not be remedied. This session was presided over by S. W. Sparrow of the Studebaker Corp. Following are abstracts of the papers.

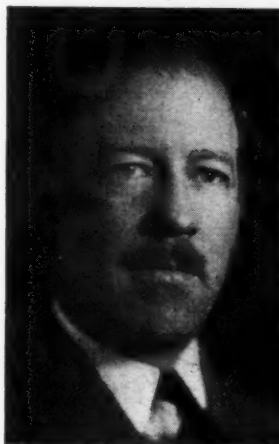
**M**R. BRIDGEMAN, in his paper on "Volatility Data from Gasoline Distillation Curves," gave a novel method of rating volatility—by the temperature at which a given air-vapor mixture will be formed under equilibrium conditions at a pressure of 1 atmosphere from any mixture of liquid fuel and air supplied when a given percentage is evaporated. Under this rating method, one gasoline will be more volatile than another if it forms the given air-vapor mixture at a lower temperature when a given percentage is evaporated. To obtain complete information it is necessary to vary the amount of air present for given weights of fuel and to employ various temperatures. In the paper the

results of all of the volatility measurements of this type made at the Bureau of Standards up to the time of writing were given. The expression air-fuel mixture referred to the ratio of air and fuel supplied while the term air-vapor mixture referred to the ratio of the components of the gaseous mixture forwarded.

All of the data were obtained with the Sligh equilibrium air-distillation apparatus, which has been previously described.

The general conclusion reached by Mr. Bridgeman is that the A.S.T.M. distillation curves give a true indication of the relative volatilities of gasolines. At any percentage evaporated, the volatilities of a series of gasolines are in the same order as the temperatures on the A.S.T.M. distillation curves, and bear simple relations to them. Thus, from the standard distillation tests, the complete volatility curves of interest in engine operation may be readily computed or read from an alignment chart given with the paper.

The correlation of the A.S.T.M. and E.A.D. curves near the initial and end points is somewhat more uncertain than over the middle range. Experiments are in progress for the measurement of the dew points by an independent method, and it is hoped that greater accuracy may be obtained over the initial range (up to 10 per cent evaporated) by extending the temperature range of the apparatus below 0 degree C., and supplementing these data with measurements on vapor pressures and molecular weights.



Photos by Lee F. Redman

Left—Neil MacCoull of the Texas Co., who presented a paper at the Research Session. Right—S. W. Sparrow, chairman of the morning research program



Photos by Lee F. Redman

Left—H. C. Mougey, chief chemist, General Motors Corp. Right—O. C. Bridgeman of the Bureau of Standards who read a paper on volatility

NEIL MACCOULL of the Texas Corp, presenting a paper on "Methods of Measuring Detonation," said he had made an investigation of the possibility of correlating the measurements of the anti-knock values of gasolines as determined by various laboratories and to this end had furnished six samples to each of 10 laboratories, including one in England. He gave the characteristics of the six samples and briefly described the apparatus and the method used by each of the 10 laboratories.

The results reported by the different laboratories, which were given in tabular form in the paper, showed wide variations. Mr. MacCough showed that if two definite fuels were accepted to furnish end points for a scale of anti-knock values, which points would be designated as the zero and 100 points, then the anti-knock value of a fuel of intermediate characteristics would be represented by widely different figures according to whether the scale used is based on the benzol equivalent or the tetra-ethyl-lead equivalent. He drew the following conclusions from his investigation:

1. There is a great need for further development of anti-knock measurements.
2. Certain elements of technique should be standardized at once, such as the mixture ratio and spark setting.



Photos by Lee F. Redman

R. E. Wilkin (left) and D. P. Barnard of the Standard Oil Co. of Indiana. They presented a paper in which P. T. Oak also collaborated



Above—H. K. Cummings of the Bureau of Standards gave the results of two detonation surveys

Below—J. A. C. Warner, chairman of the afternoon research program



3. Intensive study should be made of the fundamental methods in use for direct control of detonation in test engines, such as compression ratio, manifold vacuum, etc.
4. The measurement of anti-knock values in terms of mixtures of a reference fuel with benzol or tetra-ethyl-lead is apt to be very misleading if the peculiarities of such scales are not thoroughly understood.
5. The data given in this survey indicate that there may be no great difference in results whether the detonation point is determined by audibility, maximum power, bouncing pin, etc.
6. Eventually a reference fuel of low anti-knock and one of high anti-knock must be standardized, but this can wait, if need be, until the methods and apparatus are standardized.

The following recommendations were appended to the paper:

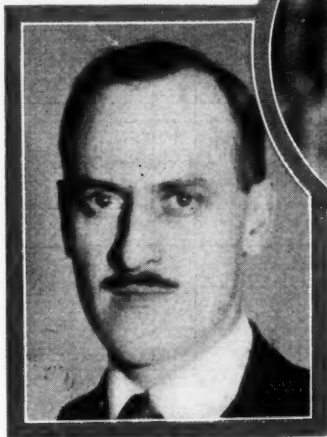
1. We believe that when a standard scale is adopted for measuring anti-knock values, it should have some direct connection with compression ratio.
2. It seems probable that if all laboratories measured anti-knock values in terms of per cent change in compression ratio (for variable compression engines) or manifold vacuum (for the usual engines) that the data taken on any engine might be related to that of any other by the simple use of a single multiplying constant.

DR. EDGAR, Director of Research, Ethyl Gasoline Corp., in his paper on comparison of methods of measuring knock characteristics of fuels, told how, at a conference held in October, 1926, which was attended by representatives of various industrial and institutional laboratories, it was decided to prepare five samples of fuel of widely varying characteristics and to ask the cooperation of a number of different laboratories in testing these samples by their own methods. Two problems were involved, viz., (a) to determine how closely different laboratories may agree on the specific problem of rating samples in a certain definite way, and (b) to determine how well different methods of rating agree among themselves.

Each laboratory was sent a small sample of ethyl fluid



Below—H. H. Allen,  
Bureau of Stand-  
ards, read a paper  
on headlighting



Above — R. W.  
Brown, Firestone  
Tire & Rubber Co.,  
discussed riding  
qualities

previously analyzed and known to contain 1.0 cc. of pure tetraethyl lead in 1.90 cc. of fluid. The laboratories were asked to determine by whatever methods they were in the habit of using, the quantity of tetraethyl lead which must be added to samples Nos. 1J to 4J, to make the tendency to knock exactly equal to that of sample No. 5J, which had been treated with enough tetraethyl lead to make its tendency to knock somewhat less than that of any of the other samples; they were not informed in advance of the exact nature of any of the samples.

The methods employed by the different laboratories for rating the fuels are briefly as follows:

Armour Institute of Technology rates the fuel in accordance with the spark advance required to produce a knock of given intensity.

By the Atlantic Refining Company's method the fuel is rated according to the throttle opening at which knocking begins.

Ethyl Gasoline Corp. rates fuels by the proportion of ethyl fluid required to make the knock characteristic the same as that of a standard fuel, a Midgley bouncing pin being employed to determine this equality.

General Motors rates fuels by substantially the same methods as Ethyl Gasoline Corp., except that detonation is brought about by varying the compression ratio of the engine and the beginning of detonation is determined by either the Midgley bouncing pin or directly by ear.

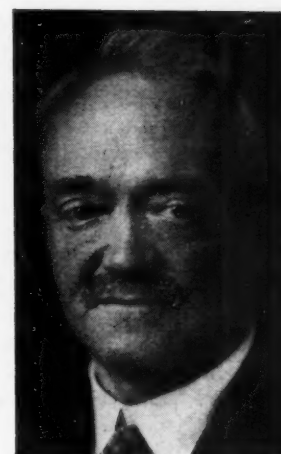
Standard Oil Co. of Indiana rates the fuel in a preliminary way by the power development of a test engine when detonation first begins. The fuel is definitely rated by the proportion of ethyl fluid which must be added to cause knocking to begin under the same load as with the standard fuel.

Standard Oil Co. of New Jersey makes a comparison of a fuel to be rated with blends consisting of different proportions of a standard fuel and benzol and gives the fuel a rating equal to the percentage of benzol in the blend that has knocking characteristics equal to those of the fuel under test.

The University of Michigan rates the fuel in terms of the spark advance corresponding to maximum torque of the test engine.

The Bureau of Standards rates fuels by the maximum indicated power that can be obtained from a single-cylinder Liberty test engine without knocking.

The results of the tests made with the five fuel samples at the different laboratories were given.



Photos by Lee F. Redman

Left—Dr. Graham Edgar, Ethyl Gasoline Corp., discussed methods of measuring knock characteristics of fuel. Right—C. Francis Jenkins of the Jenkins Laboratories

**H.** K. CUMMINGS of the Bureau of Standards in his paper briefly described and tabulated detonation test methods in use in 20 different laboratories.

Most of those who use the bouncing pin will probably agree that the novice finds the bouncing pin indicator as temperamental as the ear is indefinite, said Mr. Cummings.

By the routine method of the Bureau of Standards for determining the relative anti-knock value of motor fuels the maximum indicated horsepower developed by the test fuel at the final throttle setting (at which this fuel gives the same knock as the reference fuel at the initial setting) is compared with the maximum indicated horsepower developed by the reference fuel at the initial throttle setting. Fuels are rated on a percentage basis in terms of maximum permissible power. Thus, if the reference fuel gave 25 hp. and the test fuel 30 hp., the knock ratings would be: Reference fuel 100, and test fuel 120. Oil and water temperatures are maintained approximately constant but the intake air is not heated. All ratings are preferably made as direct comparisons between two fuels. Such comparisons are ordinarily reproducible to within 1 or 2 per cent.

S. D. Livingston of Vibroscope, Inc., demonstrating the vibroscope, used in studying high-speed motion



Photo by Lee F. Redman



THE Thursday afternoon session, which was presided over by J. A. C. Warner of the Studebaker Corp., covered a variety of subjects, all within the field of research, however. One paper read was on "Low Temperature Characteristics of Motor Oils" (which are of great importance from the standpoint of starting in cold weather); a second was on "Recent Developments in Headlighting Research," and a third on "Further Data on Riding Qualities," while C. Francis Jenkins of Washington described his high-speed motion picture camera and displayed some greatly slowed-up motion pictures taken with it, and H. Billioque described the Stroborama, a stroboscopic device based on the use of a neon lamp and which was described in *Automotive Industries* some time ago. The session was well attended.

MESSRS. Wilkin, Oak and Barnard, of the Research Department of the Standard Oil Co. of Indiana, in presenting the results of an investigation on motor-oil characteristics and performance at low temperatures, followed the methods first employed by Parsons and Taylor, whose results were given in a paper on Lubricating Value as Related to Certain Physical and Chemical Properties of Oil, which appeared in *Industrial and Engineering Chemistry* for May, 1926. Parsons and Taylor compared the viscosity characteristics of two widely varying oils, of asphalt and paraffin base respectively, at low temperatures and under varying heads.

The authors made viscosity tests at low temperatures on three different types of oil, with paraffin, asphalt and mixed base respectively. Results as to variation of flow with pressure-drop were plotted on logarithmic section paper. It is pointed out that any fluid which follows the laws of viscous flow will give in such a plot a straight line at 45 deg. to the horizontal axis, which has a slope angle whose tangent is 1. None of the oils investigated by them showed such a slope at the lower temperatures.

The deviation from the law of viscous flow is evidently due to a colloidal structure, which becomes more pronounced as the temperature is lowered. In the case of the paraffin-base oils the solid phase is undoubtedly mainly wax crystals, but some kind of colloidal particles

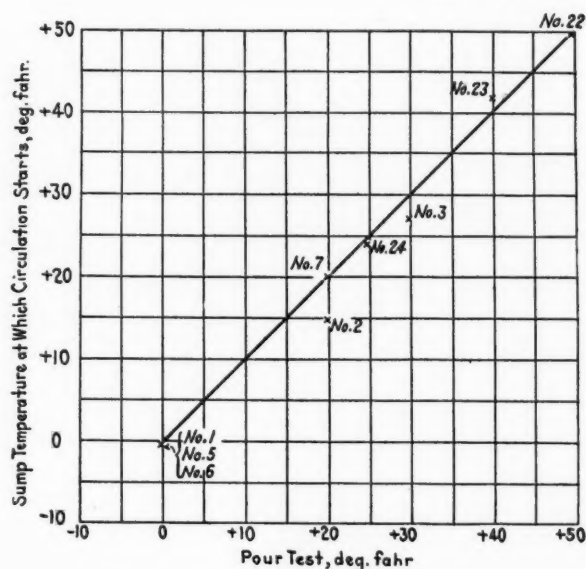


Fig. 2. Relation between pour point and sump temperature at which circulation starts

also appear to be present in the asphalt-base oils.

The authors plotted the value of  $n$ , the tangent of the angle of slope of the pressure-flow lines, for the different oils. They express the opinion that the deviation of  $n$  from unity is in some way related to the pour-test temperature as specified by the A. S. T. M. Inasmuch as the A. S. T. M. pour-test is substantially a determination of the temperature at which the apparent viscosity becomes infinite under the existing conditions of very low shearing stress, it was to be expected that if the work were extended to include very small pressures, the pressure-flow and pressure-apparent viscosity curves would show a bend at the low-pressure end, and such was found to be the case.

Automotive engineers will be interested most in some work done on the effect of oil viscosity on cranking effort, which was covered in the paper. Several engines were subjected to cranking tests in the cold room, and observations were made of the break-away torque and the torque required to crank the engine at 35, 50, 70 and 100 r. p. m. Observations were made at tempera-

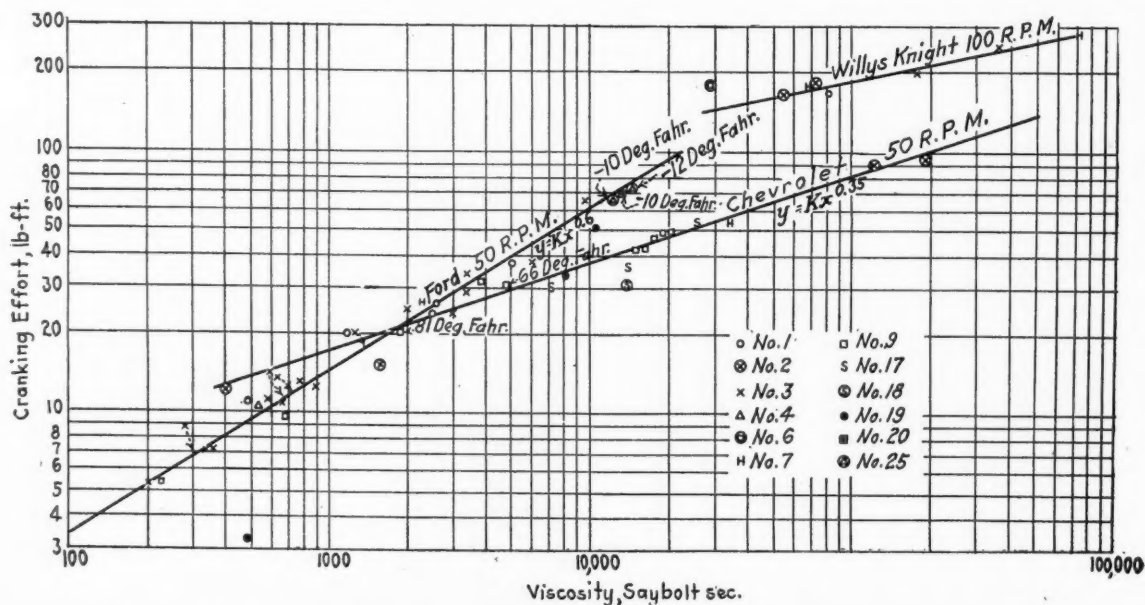


Fig. 1. Effect of oil viscosity (apparent viscosity at high shear rates) on the cranking torque of three typical engines at low speeds



tures ranging from +160 to -10 deg. Fahr., using oils varying in viscosity from 200 sec. at 210 deg. Fahr. to 100 sec. at 100 deg. Fahr. and pour test varying from +45 to -5 deg. Fahr. In most of the work the spark plugs were removed to eliminate pumping losses.

The results of these tests are given in Fig. 1, in which the cranking efforts as observed have been plotted against oil viscosity at high shear rates and estimated from inspection data by means of the Herschel chart and in many cases verified by actual measurements.

While cranking torque seems to depend on viscosity alone, in no case was proportionality between cranking effort and viscosity observed, the tangents of angles of slope of the curves in Fig. 1 varying from 0.3 to 0.6. Evidently the immersion of the flywheel and transmission in the motor oil made the Ford Model T powerplant more susceptible to the effects of oil viscosity than the other engines.

The tests on the Ford powerplant were made in "high-gear" position and correspond to cranking the car in gear but with the propeller-shaft disconnected. In general, this work indicates that the cranking-effort characteristics of an engine oil can be estimated with fair reliability from suitable temperature-viscosity data by means of the Herschel diagram.

In addition to its cranking characteristics, it is important that engine oil circulate freely in the lubricating system even at very low temperatures. The tests recorded in Fig. 2 were made in the cold room with a four-cylinder sleeve-valve passenger-car engine. In these tests the engine was cranked by the dynamometer and allowed to run at 800 r.p.m. under its own power, the time and the pump temperature being noted with relation to the development of circulation as indicated by the oil-pressure gage. The thermometer in the sump was placed as closely as possible to the pump inlet, and the gage line was cleaned carefully before starting each test. The screen over the pump intake was of 32 mesh and had a total area of 28 sq. in.

It is obvious from Fig. 2 that pour-test was the factor determining the establishment of circulation, at least with this type of oil screen.

**I**N his paper on Measuring Riding Qualities, Mr. Brown of the Firestone Tire & Rubber Co., described a new counter-type of contact accelerometer developed by him to determine the riding qualities of cars and the effect of pneumatic tires in relieving road shocks. The instrument referred to comprises a number of accelerometer elements, each connected with a separate counter. At the end of a test run the number of accelerations (or shocks) within six predetermined ranges of magnitude can be read off directly from the counters.

Mr. Brown has been experimenting with riding-comfort-indicating instruments for several years, and has presented papers on this work at several previous S.A.E. meetings. One change in the new from his previous instruments is that the inertia weight is now supported by a solenoid instead of by a spring or air pressure, whereby contact chatter has been eliminated. The force tending to hold the contacts together decreases very rapidly with the downward movement, and this prevents chatter.

In studying the riding-qualities of tires, it was found desirable to record the results over a relatively long run, perhaps as much as 50 miles. The difference caused by a change in inflation pressure of 5 lb. is very marked, and indicates that the instrument is sufficiently sensitive to indicate the effects of major factors of tire design,

such as tread contour, provided the data are taken over a sufficiently long run to get a true average condition.

**H.** H. ALLEN, of the Bureau of Standards, in presenting his paper on "Recent Development in Headlighting Research," said that this was in the nature of a preliminary report, as the work has not yet been completed. The work was begun at the Bureau last spring and is being financed by the N.A.C.C. One of the objects is to determine the distances at which various objects in the road may be distinguished under different environmental circumstances and with different lighting characteristics. Various horizontal and vertical spreads and various tilts of the beam are being tried. The investigation has been divided into two parts, viz.: driving without oncoming headlights under various specific conditions, and driving both with and without headlights under various road conditions. Dummies are being used and are stationed at the middle of the right of way; that is, on that side of the road on which the test vehicle is proceeding. From five to 15 runs are made under each set of conditions and the results averaged.

C. Francis Jenkins of the Jenkins Laboratory, Washington, D. C., described his Chronoteine camera with which photographs can be taken at the rate of 3200 per second. At this rate 200 ft. of film passes through the camera in 1 second. The pictures can be projected in a motion picture screen at a reduced rate, thus slowing up the rate of motion of high speed mechanisms and permitting of the study of motions that cannot be followed by the eye.

There was considerable discussion of the paper on low temperature oil characteristics. C. P. Grimes, consulting engineer, Syracuse, N. Y., said the oil had to be sucked into the pump when cold, hence the viscosity under pressure was not a determining factor. He described how the paraffin wax is separated from oil by the refiners, and referred to cases within his knowledge where at -20 deg. Fahr., it had taken 15 to 20 minutes from the time of starting the engine until lubrication of the piston and cylinder wall began.

P. J. Kent of the Chrysler Corp. said the break-away torque was less than the running torque and was independent of the temperature so long as there was fluid friction. There was considerable difference of opinion on this point. Mr. Kent said the impression that the break-away torque was greater was due to a peculiarity of the starting motor, which naturally takes a large starting current, owing to the absence of a counter electro-motive force when there is no speed. If a rheostat is inserted in the starter circuit the real break-away torque is obtained, and the current draw at starting is then less than at running.

Mr. Round of the Vacuum Oil Co. said he differed with Mr. Kent on the subject of break-away torques. He had used a sleeve device with a torque arm on it, the shaft within the sleeve being driven at normal starting speeds, and he found the breakaway torque to be larger than the turning torque. The motor he used was an alternating current induction motor. He had also experimented with a sliding gear machine in which the gear was slid on a shaft coated with oil, and obtained the same result.

Mr. Round said he agreed with the authors of the paper with respect to the necessity for a coarse mesh in the oil screen over the pump. The pressure required to force oil through varied inversely as the fourth power of the opening of the screen. Nothing finer than No. 20 mesh screen should be used.

## ENGINE SESSION—

Use of Automotive Engines for  
Industrial Work Growing

*Portability, low cost and reliability lead to adoption in many fields. Fuel pumps and supercharging discussed.*

By P. M. Heldt

AT the engine session on Wednesday evening, with Col. W. G. Wall in the chair, papers were presented by A. M. Babitch, of the AC Spark Plug Co., on Fuel Pumps; by C. Fayette Taylor, of the Massachusetts Institute of Technology, and L. Morgan Porter, of the Naval Aircraft Factory, on Supercharging; by H. L. Horning, of the Waukesha Motor Co., on Industrial Engines, and by H. M. Jacklin, of Purdue University, on Multiple Ignition. A paper on Heat Flow in Aluminum Alloy Pistons was transferred to a later session.

Mr. Horning said it was Herbert Spencer who made the remark that all human progress was from the ornamental to the useful. That had been the history of the automotive engine. Originally it had been designed for the propulsion of passenger cars, which was not exactly an ornamental purpose but was an application in which it served largely the pleasure of the owner. At the present time a large number of other industries are being supplied with automotive engines. In 1912 Mr. Horning's company had delivered its first engine for tractor use. In 1916 the Ingersoll-Rand Co. bought its first automotive engine for a portable air compressor set. Application of these engines to concrete mixers and power shovels came about at practically the same time. The speaker said it generally took about five years to penetrate a new industry; that is, this is the period that elapses between the time about five per cent of the firms in the industry have adopted automotive engines and the time 90 per cent have adopted them. Eighteen different industries had been introduced to the use of gasoline engines for industrial uses by his firm alone.

At the present time a large number of engines are in use in the oil fields operating drilling outfits. One of the secrets of success in this line is to make the operators

feel at home with the new powerplant, as, for instance, by making the controls as nearly as possible the same as those they have been used to. In introducing the gasoline engine in a new field it is necessary to break down an old established routine or habit and build up a new one.

In the industrial field an engine must possess four essential features in order to be a success. First it must be easily portable, and this is where the gasoline engine shines, on account of its low weight; second, it must be low in cost, and this factor is closely tied up with low weight. Thirdly, the power factor in most lines of work is high, and the engine must be capable of standing up under continued high load. The fourth factor is reliability, which is paramount in the industrial field. Sometimes an engine forms a link in a chain of operations and the entire operation would come to a standstill if the engine failed, piling up losses quickly. The engine must show this high degree of reliability in spite of poor operators.

In closing, Mr. Horning predicted that in 10 years b.m.e.p.'s would be doubled (to 160 lb.) and engine speeds would be doubled, so that four times the power would be obtained from an engine of the same weight, and that specific fuel consumptions would be cut down to 0.45 lb. per hp. hr.

THREE investigations on engine performance were covered in the paper by Mr. Jacklin. The first was an investigation of the effects of multiple ignition and

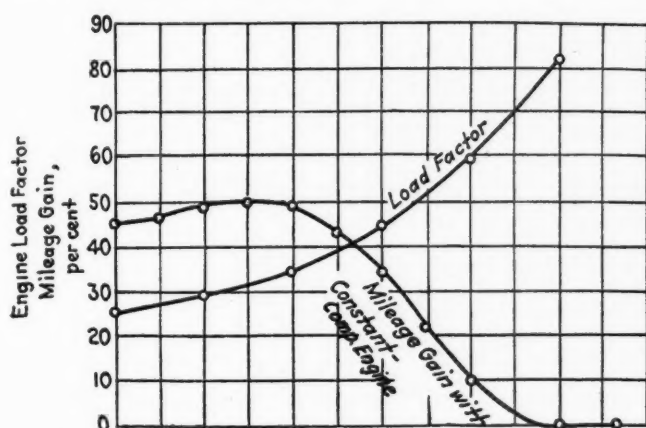
was made at Ohio State University some time ago. The second embraced some experiments on high compression (with a high-compression engine fuel developed by Dr. C. B. Forward of Urbana, Ohio), and the third was a comparison of the behavior of an engine when oper-



Left to right—H. L. Horning, who read a paper on industrial engines at the Engine Session; H. A. Huebotter, who had a paper dealing with heat flow in aluminum pistons, and Col. Wall, chairman of the session



ating as a constant clearance and as a constant compression engine. These last two investigations were made at Purdue University.



Mileage gain with constant compression engine as dependent upon load factor

The comparison of constant clearance and constant compression operation was suggested by some work on an isolated charge engine published by H. R. Ricardo a few years ago. Indicator diagrams taken show that combustion is much better with constant compression than with constant clearance, as would be expected. This probably would result in less carbon deposition and less crankcase-oil dilution. Also, the engine starts easier on partial throttle-opening. All the diagrams for constant-compression operation show the tendency to detonate, while those at light loads for constant-clearance operation show a tendency to miss occasionally. No change in throttle setting was made when changing from constant clearance to constant volume. Changes were made in the fuel and the spark adjustments.

The results obtained in the tests of the constant compression engine were used in calculating the possible gain in fuel mileage at different load factors with this engine as compared with a conventional engine, in the case of a six-cylinder open car the weight, displacement, power curve and other data of which were available. As shown in Fig. 1, at car speeds of from 16 to 24 m.p.h. the gain in fuel mileage is substantially 50 per cent.

MR. BABITCH described the AC fuel pump which was illustrated and described in *Automotive Industries* of March 5, 1927, and gave the following summary of its characteristics:

1. It weighs less than 3 lb.
2. It does not affect engine carburetion at any speed.
3. On tests for durability it has been in continuous operation for more than 200,000 miles.
4. It has been tested with every commercial grade of fuel and with all recognized anti-knock solutions.
5. It has been tested under varying atmospheric pressures and under temperatures from + 200 to - 25 deg. Fahr.
6. While it supplies only as much fuel as the carburetor requires, it has a capacity 50 times greater than the requirement of the ordinary car at any speed.
7. While the ordinary engine uses less than 0.1 cc. of fuel per revolution in regular running, it may require as high as 1 cc. per revolution when fully choked for winter starting. The mechanical fuel pump at cranking speed will supply 5 cc. of fuel per engine revolution.
8. With a  $\frac{1}{4}$  in. movement of the diaphragm, it

pumps 10 cc. per stroke, enough to fill 14 in. of 5/16 in. diameter tubing.

9. It will prime itself with a 20 ft. lift.

ONE of the possible uses of supercharging is to secure increased output at sea level from an engine of a given size. This application is particularly important where engine displacement is limited, as in automobile racing, and may become of importance in certain types of automobile, and in aircraft where sea-level output greater than the normal is required temporarily, for the take-off or for other purposes.

It is known that with increasing supercharge the thermal efficiency falls off, but at first at least this is more than balanced by the increase in combustible charge pumped into the engine. Messrs. Taylor and Porter, described and discussed some tests run by them in the Aeronautical Research Laboratory of the Massachusetts Institute of Technology to confirm the theory concerning the effects of supercharging on output and thermal efficiency and to obtain some quantitative values applying to a given set of conditions.

In discussing the paper on fuel pumps, which was abstracted above, F. G. Whittington of the Stewart-Warner Speedometer Corp. said a fuel feed system should not be judged solely by the maximum rate at which it will deliver fuel. Another important characteristic is non-interference with carburetor functions, and he expressed the view that pump feed, with delivery pressures of 2 and 2½ lb. p. sq. in. as against about ½ lb. with the vacuum system, would interfere with mixture proportioning. The pressure would be the highest when the rate of delivery is lowest. In addition, reliability and ease of getting relief in case of trouble must be considered.

David Gregg also contributed a written discussion in which he said the diaphragm pump had been found well adapted for the fuel feed systems of aircraft, even if a supercharger is used, having certain definite advantages over the gear pump now in common use. S. W. Sparrow of the Studebaker Corp. said with the improvement in our roads it had become the custom to drive for long stretches with full open throttle, and the vacuum in the inlet manifold was then inadequate to supply the fuel, which made it necessary to look for another system. Ferdinand Jehle of the White Co. saw a number of objections to the diaphragm pump, but said it was necessary to have a supply of fuel in the carburetor at all times, and as with large engines running under heavy load much of the time this could not be depended upon with the vacuum system, the pump was the lesser of two evils.

In discussing Mr. Horning's paper, R. J. Broege of the Buda Co. said he agreed with the author that in industrial work engine reliability was a prime essential. However, he did not share the view that Diesel engines lacked this quality. These engines were largely used for marine work and there, if anywhere, reliability counted.

Dr. S. A. Moss of the General Electric Co. contributed a written discussion on the paper on Supercharging. He thought some of the results obtained were accounted for by inadequacy of the experimental equipment. The efficiency of the supercharger had been assumed to be 60 per cent but with a General Electric supercharger an efficiency of as high as 70 per cent had been obtained. He also deprecated the idea that there should be a material loss in efficiency due to the use of a supercharger.

## STANDARDS SESSION—

Use of S. A. E. Viscosity Numbers  
Causes Argument

*Several oil company representatives object to system, saying it gives small companies chance to "cheat."*

USE of S.A.E. numbers to indicate viscosity ranges of lubricating oils came under fire at the Standards Session. Its primary business, that of considering sub-committee reports and suggested standards disposed of, a paper was presented by E. W. Upham of the Chrysler Corp. on the "Importance of Car and Oil Manufacturers Specifying Oils by S.A.E. Viscosity Numbers," designed primarily to encourage more widespread use of the S.A.E. designations, adopted as standards now for over a year. Discussion of the paper went back to fundamentals as to whether it was desirable to have such a standard or not. In fact the discussion became so heated and drawn out that it finally became necessary for Chairman Karl L. Herrmann to call the meeting to a close.

The net result of the discussion was an indication, however, that those manufacturers and oil companies who are using S.A.E. numbers to designate viscosity ranges rather than the meaningless "medium," "heavy," "medium heavy" and all their variations, are very much in favor of the system. Opposing them were several oil companies who are not using the system and who claimed the use of S.A.E. viscosity designations on cans gave the small oil company a good opportunity to sell a poor grade of oil on the basis of "S.A.E. indorsement."

It being generally admitted, however, that present oil designations of light, medium, medium heavy, etc., meant

little compared to one another for different oils, it seemed to be the majority of opinion at the meeting, as expressed by Fred Sampson of Continental Motors, during the discussion, that it was up to the oil companies either to accept the S.A.E. designations or else get up a standard of their own in short order.

The proposed S.A.E. standards and recommended standards which were adopted or modified were covered in last week's issue of *Automotive Industries*. There was considerable discussion regarding angles for V-belt pulleys. The committee report advocated standardizing on a single angle, 38 deg., which was objected to on the ground that this angle was too large for many cases, especially where fan belts are not used to drive accessories. Final action of the session was to refer the report back to the committee for further consideration.

The Steel Committee reported that among other work ahead of it was the increase of phosphorus and sulphur content in S.A.E. steels. A further elucidation of the proposed revision of the physical property charts of S.A.E. steels was given in conjunction with the report by H. T. Chandler of the Vanadium Corp. of America. Mr. Chandler emphasized that it was not the point of the proposed revision to change the form of the charts in any way. What it is proposed to do is to obtain data on industrial test results on the various S.A.E. steels from the manufacturers of automotive units and parts



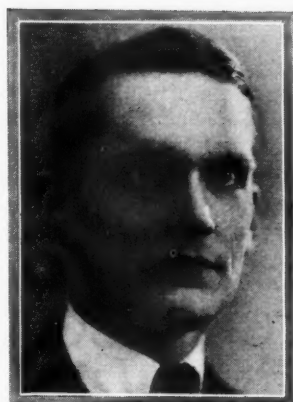
Photos by Lee F. Redman

Among those who took part in the Standards Session were Fred W. Sampson (left), of Continental Motors Corp., and Charles P. Grimes of the Quaker State Oil Refining Co.

Left—A. J. Underwood of the Standards Department of the S.A.E. Right—G. A. Round, assistant chief, engineering division, automotive department, Vacuum Oil Co.



from their records, apply to this data the laws of probability, and thus obtain maximum, minimum and average readings. With these results it should be possible to change the physical property charts so as to conform more nearly to the steels in industrial use, and tested under industrial conditions rather than laboratory conditions as represented by the present charts. The net result would be to slightly shift the various curves without changing their method of representing properties.



H. T. Chandler, Vandalium Corp. of America, discussed the steel physical-property chart

What started the discussion on S.A.E. oil viscosity numbers was the paper presented by Mr. Upham, chairman for 1928 of the S.A.E. Lubricants Division. Mr. Upham started out by reiterating the need for some method of designating viscosities of oils, referring to the adoption of the S.A.E. numbers as a way out in 1923 and an article on the subject in April, 1926, by H. C. Mougey of the General Motors Corp. The final specifications, adopted in 1926, are based only on viscosities, and are designed to enable manufacturers of engines and automobiles to tell purchasers in a simple manner what viscosity of oil should be used in their products.

A survey recently made of methods of indicating lubricating oils in instruction books of automobile companies shows that in general they are by:

1. Listing names and grades of lubricants which are

considered suitable for the particular car in question.

2. Listing one name and grade and recommending that or an equivalent.

3. Using a general term such as, "a medium, well refined oil."

Criticism of these methods is that the first requires too much labor and too many tests, that the second is unfair and that the third is meaningless, unless so technical that the car owner cannot understand it.

As against this, stamping of S.A.E. viscosity numbers on oil filler caps helps in the selection of the correct grade, not only to the owner but also the oil dealer. Seasonal variations can also be handled better by the S.A.E. numbers. The Chrysler Corp. uses this method of designating lubricants.

About 20 automobile companies have agreed to incorporate the S.A.E. numbers in their next instruction books. One large oil distributor already uses the method, and 30 are considering it. Several oil companies are already stamping their cans with the numbers. Mr. Upham requested more publicity for the system, better instruction to filling station operators.

G. A. Round of the Vacuum Oil Co., fired the opening gun at the end of Mr. Upham's paper. "The Vacuum Oil Co.," stated Mr. Round, "does not use the S.A.E. numbers and it will not adopt them. Use of the numbers is tantamount to telling the layman that any S.A.E. standard oil viscosity means that it is a good oil." Mr. Round claimed that the S.A.E. initials on oil containers were used unfairly in competition by low grade oil manufacturers in claiming that their oils were indorsed by the Society and that this applied not only to the oil salesman but also to several oil companies.

In opposition to Mr. Round, O. E. Eckert of the Mid-Continent Oil Co., emphasized that whatever be the designation of an oil as regards "body," it should clearly refer to viscosity.

## Aeronautics Discussed at General Session

WITH the ever-widening interest in aeronautics among automotive engineers, the general session was devoted to flying. A program of a slightly different character from the usual technical session was presented, however, with such prominent figures as Edward P. Warner, Assistant Secretary of the Navy for Aeronautics; Major H. A. Dargue, of Navy Good-will South American flight fame; J. A. Wilson, Controller of Civil Aviation for Canada; Col. L. H. Brittin of the Northwest Airways; George Mixter of Stone & Webster and the Pan-American Airways, on the list of speakers. Col. Harry H. Blee, representing William P. MacCracken, Jr., Assistant Secretary of Commerce for Aeronautics, opened the session with a general discussion of commercial domestic and international flying possibilities, stating that soon commercial airlines in this country will be operating on a basis of 25,000 miles daily.

The entire session was built around international air communication possibilities, with both Central and South American and Canadian connections studied. Several interesting facts were brought out. Mr. Warner stated that for the first time in over eight years the Navy has placed a quantity order for flying boats, which industry has been dormant for this period. Flying boats or seaplanes are a requisite development if direct communication with Panama and any type of long over-water communications are to be made practicable, according to Mr. Warner. Mr. Warner also stated that

if 20 per cent of the first class letters and 1 per cent of the parcel post matter between the United States and Central America were carried by air, a total of 400 lb. of mail daily would be available.

Major Dargue stated that commercial flying speeds for some years to come will not exceed 150 m.p.h., and emphasized that this speed must be taken advantage of as much as possible to enable the airplane to compete successfully with other means of transportation. Major Dargue also prophesied that in a few years a large proportion of the commerce of the Caribbean countries will take to the air and that there will be a good market in these countries for American aeronautical products.

Two technical problems were offered by Mr. Wilson for solution by engineers to enable winter air communication with Canada—a ski-wheel and a ski-float combination.



Photo by Lee F. Redman

E. P. Warner, Assistant Secretary of Commerce for Aeronautics, who spoke at the General Session

## CHASSIS SESSION—

## Brakes, "Shimmy" Cure and Shock Absorbers Are Discussed

*D. Sensaud de Lavaud explains principle of independently sprung front wheels. Steeldraulic brake is described.*

THREE papers were presented at the Chassis Session on Friday, which was presided over by W. R. Strickland. One was on "Independently Sprung Front Wheels as a Remedy for Shimmy, Improvement of Suspension and Steering," by D. Sensaud de Lavaud, which covered substantially the same ground as an article by M. de Lavaud of which a translation was published in *Automotive Industries* of Nov. 12, last; another was on the subject of "Shock Absorbers From the Car Manufacturer's Standpoint," by H. F. Hadley of the Chrysler Corp., and the third on "New Developments in Brakes," by John Sneed of the Midland Steel Products Co.

Mr. Sneed in his paper asserted that the brake shoe should be so designed that it will be effective over the total periphery of the drum face rather than on the diameter of the drum only; which, since the drum will distort under high pressure, means a flexible shoe. He considers a high degree of self-energization desirable, because it permits of liberal brake clearance, moderate pedal effort and large pedal motion reserve. A further advantage of strong self-energization is that under severe braking conditions the shoe will follow the expanding drum without materially cutting down the pedal motion reserve. The brake adjustment of the Steeldraulic brake, which embodies the features referred to by the author, varies the effective circumference of the shoe rather than acting on the actuating mechanism.

One of the features of the Steeldraulic brake is the conduit and cable control. The cable serves to transmit motion to the brake element, and the conduit supports the cable while under tension in a curved position. The conduit comprises interfitting steel vertebrae with ball and socket contact surfaces. The vertebrae present a much larger bearing-area to the cable when the conduit is curved than when it is straight. This form was found necessary to prevent binding of the cable between adjacent vertebrae when the conduit is bent and to force a circulation of lubricant around the cable. The vertebrae are

kept under a constant compression by a heavy spring-cover. This spring, wound close-coiled, is stretched, and into it are screwed the conduit terminals leaving all vertebrae under a compression of about 50 lb. p. sq. in. The spring also keeps the vertebrae in perfect alignment. The assembly is then covered with a waterproof boot. Lubrication is unnecessary after installation, for the conduit is packed at the factory with sufficient lubricant to last double the life of an average car.

The Steeldraulic brake shoe consists of a flexible central band section with comparatively rigid end sections which take up the force of brake application and serve for purposes of adjustment. Because of the fact that the expanding movement of each shoe is approximately one-eighth as great as the pedal-travel, it is apparent that the force exerted by the actuating means is not sufficient to generate or to develop a great deal of braking force through its own wedging action. It is, powerful enough, however, to bring the short rigid section of the shoe into contact with the drum. This short rigid section, which is composed of the adjuster and the adjuster brackets, then serves to bring the band section into contact, and the band, in turn, serves the shoe section.

In discussing the de Lavaud paper, Mr. Strickland said the analysis of shimmy and wheel wobble made therein had received a great deal of favorable comment, and contained something of benefit to all car engineers. The sweeping condemnation of the present system of front axles was not so commendable, however. If the author's system of separately sprung front wheels were applied to cars driven in this country, there was no telling what the result would be. It was known, for instance, that American cars for use on European roads required entirely different springing and damping than for use on the roads of this country.

We have been able to minimize the effects of shimmy and wobble by attention to detail. When low pressure tires were first introduced, extremely low pressures were used, and these were now



D. Sensaud de Lavaud (left), whose paper on the prevention of front wheel shimmy was read by W. R. Strickland (right), chairman of the Chassis Session



recognized as impracticable. The very small oscillations on smooth pavements, such as those due to the joints in concrete roads, cannot be eliminated by the tires but must be taken care of by making the springs work, aided by the shock absorbers. The shimmy problem has been pretty well taken care of.

In the discussion of the paper on brakes the author was asked why he preferred molded to woven brake lining. He said woven lining, owing to its structure, absorbed a great deal of moisture, which caused it to lose its high friction coefficient. What he would like to see is a woven friction material that does not absorb more than 0.1 per cent of moisture. A friction coefficient of 0.5 is quite all right if it can be maintained. The author made a plea for standardization of the friction coefficient between 0.4 and 0.5. When questioned as to the ease of relining of his brakes he said the servicing methods had not been fully settled, but in general the brakes would be serviced through the car dealers. The lining used was easier to put on in service than the ordinary woven lining.

A. J. Scaife, field engineer of the White Motor Co., said that each type of lining had its proper field of application. For foot-application the woven lining was satisfactory; when vacuum application was used it was well to use the compressed lining, while for air application a metal lining was best. Some operators had used woven lining with air application but it was then necessary to decrease the air pressure in the cylinder from 40 to 6 lb. p. sq. in. He advocated the use of lubricant on metal-to-metal brakes to prevent scoring.



Photo by Lee F. Redman  
Joseph Bijur of the Bijur Lubricating Corp., was seen at the sessions

## Beauty is Called Prime Requisite in Car Design

*That is what public wants first, says R. M. Bach. Lacquer problems outlined in paper by Dr. Given.*

IT would be hard to find another paper delivered before an engineering society that met with the acclaim accorded the address on "Body Design" given by R. M. Bach of the Metropolitan Museum of Art at this session.

To summarize just a few of his ideas:

The customer has come to accept the word of the manufacturer for "construction," that which he cannot see; he will not, however, take anybody's word for the appearance of the car—that which he can see. The producer works from the inside of the car out, but the consumer starts at the outside and works in. In the final analysis it is the appearance which keeps a car sold. If appearance is not present interest is lost at the outset. In order to evolve a style that will meet with the approval of the public, it is necessary to anticipate its desire. To do this it would be far better to take past rejections of designs and study the reasons than to take past preferences from a period when the public's taste was in a state of transition.

It is essential that the design or appearance of a car be correct above all. A faulty engine can be repaired—a design cannot. From Mr. Bach's point of view appearance is an integral part of performance. As he stated, "Performance to me is more than just hill climbing, speed or acceleration—it also includes the car's appearance when it is standing still."

Following Mr. Bach's address, Dr. G. C. Given of E. I. du Pont de Nemours & Co., gave a paper on the present status of lacquer development, stating its achievements and some of the problems still to be met. He also recommended a wide use of "mist-coating" after sanding. This operation consists of spraying on a slow vaporizing thinner which dissolves part of the

coat, filling up scratches and giving a better finish.

Durability of lacquer is influenced by its composition. Too low a ratio of pyroxylin to other ingredients will produce a finish which will check or craze. If pigment is of the incorrect type the finish will fail in a short time. Too high a ratio of pyroxylin will impair the adhesion.

The only safe way to produce gloss is by careful control and complete grinding. Second only to durability in lacquer is its working properties. As to number of coats necessary, a film of .0015 in. is sufficient for complete protection except in the lighter shades, where four or five coats are often necessary. Spraying concentration of lacquer cannot be obtained and still retain durability.

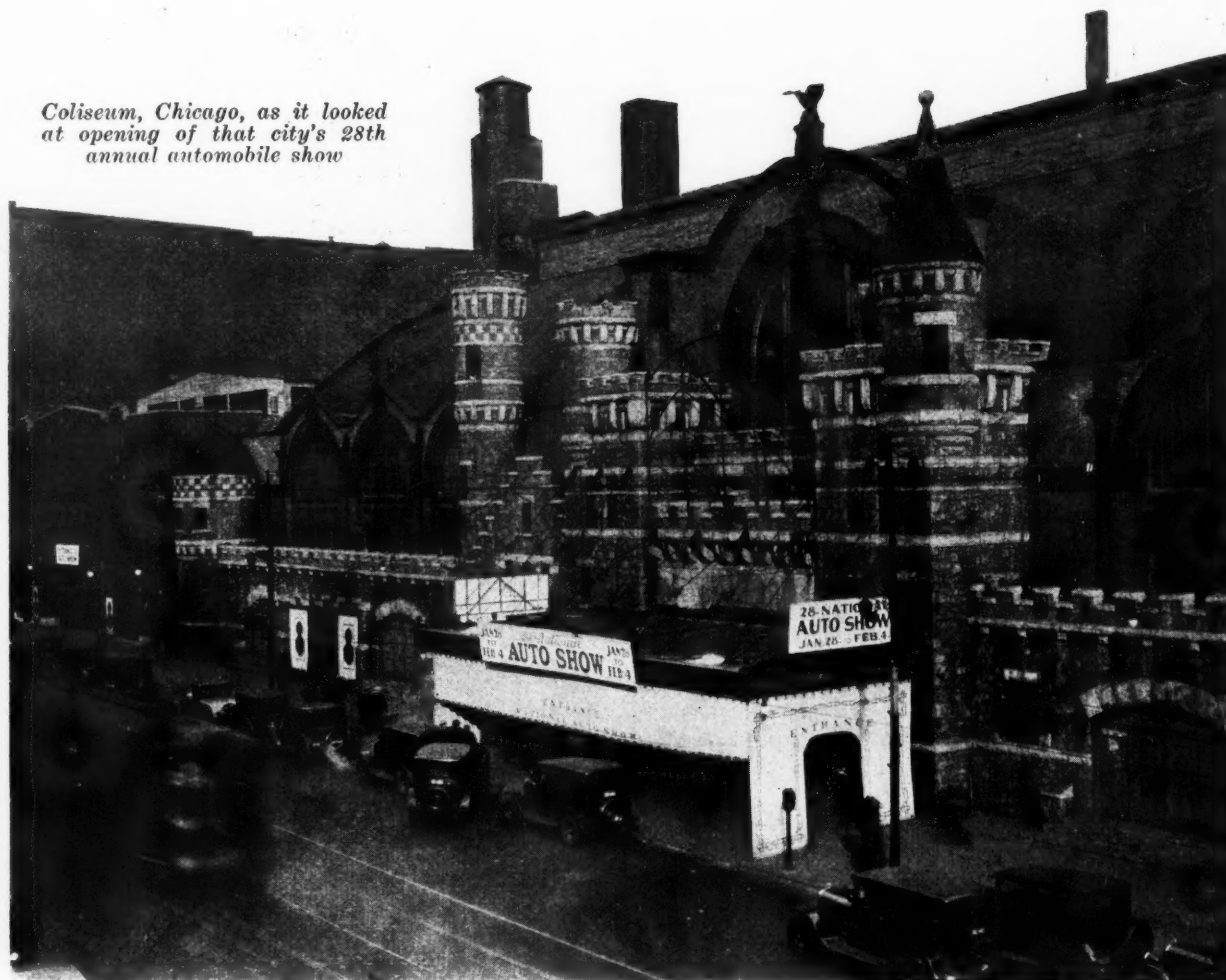
High grade lacquers dry in three minutes at 125 deg. Fahr. Smooth finish cannot be obtained by simply using more thinner, since then more coats are required. Ease of polishing is obtained by fine grinding of the pigment. Some colors are still hard to touch up although much advance has been made in this line.

A large amount of hand rubbing can be replaced by applying a very wet coat of thinner containing a large proportion of solvent, causing lacquer to flow over sandpaper scratches.



Photo by Lee F. Redman  
L. Clayton Hill was chairman of the Body Session

*Coliseum, Chicago, as it looked  
at opening of that city's 28th  
annual automobile show*



# Uncertainty Follows Nash Cuts at *Chicago Show*

Price situation again in doubt although indications are stability will prevail. Business outlook good.

*By Norman G. Shidle*

**C**HICAGO, Feb. 1—Nash price reductions announced today constitute probably from a trade standpoint an important development of the week during which is being held the twenty-eighth national Chicago automobile show.

The show opened last Saturday with the exhibits placed in a setting designed to simulate the great outdoors and containing with very few exceptions the same brightly colored and attractive new models which caused the public to throng to the New York show several weeks ago.

A new Auburn body model, a new Peerless body model and a new engine of greater power in one Elcar model are about the only new developments here which were not seen at the New York show. Trade interest,

therefore, naturally centered around merchandising matters.

When the first day of the show passed without any price cuts making their appearance, it began to look as if price stabilization had taken place, and that the buying hesitancy which had been somewhat evident as a result of the shifts made at and preceding the New York show would be definitely ended at once.

The Nash announcement today, however, naturally is causing renewed speculation in the trade as regards prices on competitive models and it still is too early to say definitely just what further moves are to be expected.

There is strong evidence to indicate that decreases throughout the middle-priced competitive group are not



going to follow, as executives of some organizations feel that values already are more outstanding than ever before. Executives of some other companies concerned did seem to feel several weeks ago, however, that price cuts by one company in this group would mean similar action in other instances.

In any case, the next week or so, and perhaps the next few days, should tell the entire story one way or the other. Then, it appears certain, the industry will be set firmly for the spring selling season with prices stabilized, sales organizations keyed to a high pitch, and buyers ready to come into the market in large numbers.

While fewer factory executives attended the opening sessions at Chicago than studied the New York show in its opening hours, those who were in town on Saturday almost unanimously agreed that the relatively light selling which has been experienced by a majority of lines in the local shows thus far, despite record crowds in many instances, has been due to no small extent to the talk of a price war generated by the price cuts during and immediately preceding the big eastern exhibition.

The sales hesitation which resulted from price cutting at the New York show back in 1922 was recalled by more than one factory man and several purported to see something of the same set of conditions in the process of functioning at the present moment. Some companies, of course, unquestionably have been taking bona fide retail orders at a rapid rate ever since the first of the year, but an analytical look behind the scenes indicates that while retail sales in general are ahead of those in January, 1927, a really marked increase in such orders has taken place in only a few instances.

That considerable advances over last year will be recorded all along the line for the first half of the year as a whole, however, is freely predicted, and apparently with sound reason.

As was the case last year, volume of sales and sales increases are not being distributed uniformly throughout the various companies. Some new models unquestionably have caught the public fancy more strongly than some others and progress again is going to have to be measured in terms of individual company accomplishment rather than in purely general terms. It is too early, of course, to be certain just how the various models will go in any detail, but the individual activities and potentialities may well be studied carefully as the show season draws to its completion in the next month or two.

Even more than at New York, the Chicago exhibit at its opening gave evidence of developing strong trade interest. Before the doors of the show itself opened there were many mid-western dealers in town along with a good number of jobbers, maintenance men and others in the distributing end of the business eager to see for themselves the products about which they have been reading for the past few weeks, and to establish better contacts with their old sources or make the acquaintance of new manufacturers and factory representatives.

Forty-four makes of passenger cars, 14 makes of trucks, one taxicab, 105 accessory exhibits and 41 shop equipment booths make up the Chicago show this year. The shop equipment exhibits—which, with the parts and accessory sections of the show, are under the supervision of the Motor and Accessory Manufacturers Association—seemed to be meeting with

unusual success just as they did in New York and as they have at several local shows as well. Not only are these exhibits proving profitable to those shop equipment manufacturers who exhibit, but also they are helping materially to stimulate and revivify trade interest in the shows as a whole.

So far as technical or body trends are concerned, Chicago has nothing which has not already been recorded as a part of the review of the New York show. A few more bizarre color schemes are on display, perhaps with the thought that they are better suited to mid-western than to eastern tastes, but otherwise the differences in the exhibits themselves are very detailed in character.

Comments of various show visitors, however, overheard on the opening day indicate that the public here as elsewhere actually is being strongly impressed by the unusual values that are being offered today in automobiles, and there can be little doubt but that the industry has on the market such designs as will make certain an excellent selling year in 1928. That is a clear impression to be gained from the Chicago show.

### *Elcar Changes*

**E**LCAR'S new engine, which has been adopted for the big eight model, is featured by dual manifold-ing and carburetion. With these features added the body models carrying this engine have their model designation changed from that of "8-92" to "120," representing approximately the horsepowers of the respective engines. Two body models are shown on this more powerful chassis, a five-passenger and a seven-passenger sedan, corresponding in appearance, equipment and price to the same models on the "8-92" series. The engine, it should be noted, is a  $3\frac{1}{4}$  by  $4\frac{1}{2}$  in. bore and stroke Lycoming, with the model designation of DM.

One more change should be noted on the new Elcar models. There is a new radiator shell on the eight of the same general type as that formerly used except that at the top the shell comes out into a point projecting forward, giving it an effect of more speed through streamlining.

### *Auburn*

While the original announcement of the new Auburn models included that of the "115" big eight cabriolet roadster, this model has not been shown previously. Its price has not yet been announced but it is not expected to differ materially from that of other body models on the same chassis. One or two novel features, minor in themselves but characteristic of the attention given to detail, are found in this model. For instance, the nicked landau irons are placed inside the car, where they are better protected against corrosion and weathering. This also gives the outside a cleaner appearance, approaching more nearly the coupe type of design. Another little feature of interest is in the method of fastening down the top. Back of the seat there are two rings to which are hooked nicked bolts. With the top down, these are passed through rings in the top bow of the top on either side, and a thumb nut is screwed down tightening the top in place, preventing rattle.

This model, as usual, has a rumble seat with step plates provided at the right rear fender. It is equip-

ped with six wire wheels, the two spares being carried in fender wells; a trunk rack, cowl-lights mounted on nicked cowl bands, a dash gasoline gage, and a water thermometer also mounted on the dash. The instrument board itself is colored to match the light pigskin upholstery. Other equipment is similar to that carried on all "115" chassis body models.

### *Peerless*

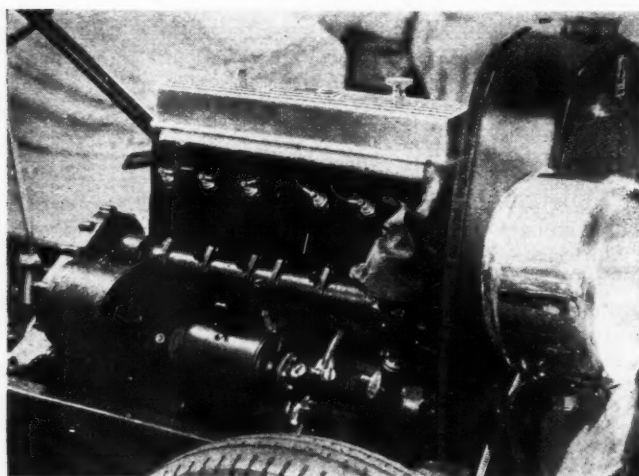
Wheelbase has been lengthened on one of the new Peerless Series 91 models. This chassis, which represents the latest Peerless offering among its five chassis models, is now offered in two wheelbases, the regular models being mounted on a 120 in. chassis, while the latest model, a seven-passenger sedan, has a 128 in. wheelbase. It is priced at \$1,985, \$100 higher than the five-passenger sedan. In design it follows closely other Series 91 models. Included in its equipment are six wire wheels with the two spares carried in fender wells.

### *Moon*

A new Moon 6-72 six-cylinder roadster was shown for the first time. Its body lines correspond closely to those of the other 6-72 bodies, being of the French-Spanish motif. While coloring is optional, the model shown was finished in brick-red and black with pigskin upholstery. Wood wheels are standard, and equipment includes nicked cowl-lamps on nicked cowl bands, cowl ventilator and rumble seat in addition to regular 6-72 body model equipment.

### *du Pont*

Probably leading in interest in the way of purely technical developments made public for the first time at the Chicago show is the supercharger shown on a stripped du Pont chassis. It is not standard equipment as yet, nor is it an accessory, since it has to be



*Showing application of supercharger to du Pont engine*

designed into the engine in some respects. In principle it is of the stratifying type and operates by injecting a charge of air into the cylinder at the bot-

tom of the intake stroke. The air does not pass through the carburetor or induction system but through the cylinder block and thus does not interfere with the normal intake system except insofar as carburetor adjustment is concerned. The basic idea, of course, is to raise the compression pressure without increasing the compression ratio, and thus obtain high torque, especially over the low and accelerating speed ranges.

Since the air which is passed into the cylinders by means of this supercharger is in addition to that passing through the regular intake system, one of the major problems of the supercharger as it is commonly known is eliminated—that of running a blower at sufficient speed to produce enough capacity to fill the entire piston displacement with the air and fuel mixture. In fact, whereas the usual type of supercharger has to be run at engine speed, and sometimes higher, the type on the du Pont chassis runs at one-half engine speed. The blower itself is of the positive low pressure type. From it air passes through a rotary distributor valve, chain-driven from the camshaft extending along the base of the right side of the cylinder block, and thence into the cylinders.

Being driven at relatively low speeds, the rotary valve does not present any difficult lubrication and cooling problems. Both of these are taken care of from the regular systems in the engine, a pressure line from the oil pump furnishing the lubrication and a passage from and to the cylinder block cooling the valve assembly. Being driven also at slow speeds, another feature considered objectionable in superchargers, that of noise, should be noticeable by its absence.

In action, the air added to the cylinder charge by the supercharger forms a layer of cool air which when compressed is said to have the effect of preventing detonation, even with the higher compression pressure. Naturally with this type of design it is necessary to run with a slightly richer carburetor mixture than is usually the case, since enough fuel must be supplied by the carburetor to take full advantage of the additional air. The amount of "richening" required, however, is claimed not to be very large. In such a case, if the supercharger or its drive should fail the only net result would be that the engine would be running for a time on a slightly over-rich mixture, not sufficiently so to impair its operation, it is said. In fact it should be possible to disconnect the supercharger drive and operate the engine without it by giving it a normal carburetor setting.

### *Hayes Body*

The Hayes Body Co. exhibited a five-passenger sedan body possessing several constructional features. The outstanding of these is a folding-type roof which it was demonstrated could be moved from the fully open to the fully closed position in less than 30 seconds. When in the open position the body gives the effect of a phaeton except that the top rails remain in position as on the conventional sedan body. Zipper-type fasteners along the parting line of the fabric portion of the roof provide a fast and apparently workmanlike method of securing the necessary joint effect. This body also incorporates a fully adjustable seat and as shown the rear door was hinged at the center pillar with the door handle and lock placed at the after end of the panel element.



# Show Briefs from Chicago

CHICAGO, Feb. 2—The day when nearly all the automotive companies had headquarters in the Blackstone, Congress and Drake hotels during the Chicago show week is no more. The Stevens and the new Palmer House now have quite a representation and the conscientious caller who would see all his friends has a good deal of territory to cover.

\* \* \*

THE automotive side-shows at Chicago included General Motors at the Stevens; Ford at the 131st Regiment Armory; Chrysler at the Congress; the Salon at the Drake; Willys-Overland at the Palmer House, and Graham-Paige at the Blackstone.

\* \* \*

THE expansion of hotel exhibits is charged to the new competition by one expert observer. In these days of strenuous competition of industry with industry, the alert motor car manufacturer is overlooking no means of keeping his product in the public eye.

\* \* \*

WE must have light," was the comment of Fred Cornell, vice-president of the C. G. Spring & Bumper Co., when he first gazed upon his company's exhibit on the mezzanine floor. Fred, it appears, takes considerable pride in a beautiful display case which has been designed to exhibit C. G. bumpers under strong lights, much the same as a painting in a museum. And when Fred saw his creation minus the lights he put in a hurry call for the electricians.

\* \* \*

O. P. KILBOURN, assistant sales manager, Willys-Overland, Inc., was an early ar-

rival at his company's headquarters in the Palmer House. He reported a tremendous demand from the farming regions, and almost everywhere in the South, for low-priced motor cars. As a result, there is a shortage of Whippets in the field and production of all Willys-Overland lines, now about 800 per day, will be shortly advanced to 1000 and in March, it is hoped, 1500 will be reached. A contract for a million-dollar addition to the body plant has been let.

\* \* \*

ACCORDING to Earl McGinnis, advertising manager of the AC Spark Plug Co., his company is the only accessory exhibitor requiring an entire express car to transfer its display to the show. Earl said that the various articles used in the AC booth weighed 16,000 lb.

\* \* \*

WE are planning to produce 5000 cars during February," said Henry Krohn of the executive staff of the Graham-Paige organization, "and the way things are shaping up it looks as if we can do it even though we are bringing out a complete new line of cars."

\* \* \*

AMONG the early arrivals at the show were the Oakland-Pontiac officials. Bright and early Saturday morning, A. R. Glancy, president, was waiting for his rooms in the Hotel Stevens. And just a few minutes later were found W. R. Tracy, vice-president in charge of sales; Col. E. M. Lubeck, western sales manager; B. B. Kimball of the sales department, and M. L. Buck, used car manager, holding a little round-table conference at breakfast.

THE big smile which Rufus Cole was wearing at the New York show is still with him. Rufe had a smile a mile wide when he was spied getting into an elevator at the Stevens, Saturday morning. And Rufus naturally implied that Hupmobile business is still going like a million dollars.

\* \* \*

GEORGE D. McCUTCHEON, one of the veterans of the industry, greeted old friends and made new ones during show week in and around the Chrysler exhibit at the Congress Hotel. Mr. McCutcheon was first associated with Walter Chrysler in the days when Mr. Chrysler was head of the Buick organization, later he was with him in Willys-Overland and now he is back with him doing staff work for the Chrysler Corp.

\* \* \*

ACCORDING to executives of the Marmon Motor Car Co., Marmon is getting under way for what looks like this veteran organization's greatest year. With the opening of the Chicago show the factory was already behind in filling orders from dealers, and the outlook was extremely promising for a big spring and early summer business.

\* \* \*

SID BLACK, vice-president in charge of sales of Chandler-Cleveland Motors Corp., was one of the few executives at the Coliseum shortly after the opening. He said Chandler deliveries were running 50 per cent over last year at the corresponding period.

# AUTOMOTIVE **NEWS SECTION** INDUSTRIES

Philadelphia, Pennsylvania February 4, 1928

## Dealers Spur Sales Efforts as Shows Maintain Interest

PHILADELPHIA, Feb. 4—Continued heavy attendances at automobile shows in all parts of the country give increasing evidence of public interest in the 1928 automobile. Though this interest has not been displayed in unusual retail buying to date, dealers everywhere express confidence of record sales soon to be under way and to continue through the first half of the year.

Delay in the actual placing of orders is ascribed in many cases to unsettlement in the public mind as to the course of prices. Revisions occurring at the time of the New York show are held mainly responsible for this though there has been a general steadying since.

To some extent delay in new car buying is due to poor market conditions for used cars in practically all parts of the country. Though used car stocks are not unduly large they have been slow in moving and this has held back new car movement.

Good sales conditions are reported from an increased number of centers, New England and the Pacific Coast  
(Continued on page 180)

## Nash Lowers Prices, Would Cut Appraisals

CHICAGO, Feb. 1—Describing 1928 as a period of the automobile industry when the ability to meet competition by better business methods was never more necessary, Charles W. Nash, president of Nash Motors Co., today presented new prices on Nash models to dealers at a meeting in the Congress Hotel. He also announced optional colors. Mr. Nash urged dealers to educate the public to a lower valuation of used cars. This he said might mean selling a few less cars. The new Nash prices follow:

	Standard Six	New	Old	Reduction
4-door sedan.....	\$ 925	\$ 995	\$ 70	
Cabriolet .....	925	995	70	
2-door sedan.....	845	895	50	
Coupe .....	845	875	30	
Landau sedan.....	995	1,085	90	
<b>Special Six</b>				
4-door sedan.....	\$1,295	\$1,335	\$40	
<b>Advanced Six—121 in. W.B.</b>				
4-door sedan.....	\$1,495	\$1,545	\$50	

## Lovejoy Reduces Prices

CHICAGO, Jan. 30—A price reduction of \$15 on Lovejoy hydraulic shock absorbers was announced on the opening day of the Chicago National Show by Ralph S. Lane, president of United Motors Service. The reduction brings the price of the Model J, used on larger automobiles, to \$40 and of the "Baby Grand" to \$25 for a set of four.

## N.A.C.C. Production 221,890 in January

CHICAGO, Feb. 2—January production of cars and trucks by members of the National Automobile Chamber of Commerce totaled 221,890, according to preliminary estimates presented at directors meeting today. This was 69 per cent over December output and 18 per cent over last January. Encouraging reports of business done as result of shows were also made. Directors went on record as opposed to toll highways on the ground that highways should be free for use at all times by everyone.

## January Outputs Higher

NEW YORK, Feb. 2—Production reports from automotive manufacturers indicate general increases in January over January last year. Chevrolet built 91,000 as against 73,676; Hudson built 25,390 against 12,000; Buick built 17,042 against 18,260; Packard built 4150 against 2300; Hupp built 3610 against 2749 and Reo built 2384 against 2322. Graham-Paige built 1497 against 1021 in December.

## Studebaker Gains 51%

SOUTH BEND, Feb. 1—Retail sales of Studebaker and Erskine cars in the first 20 days of January were the largest for any similar period in Studebaker's history, exceeding by 51 per cent the corresponding period of 1927, according to A. R. Erskine, president of the Studebaker Corp. of America. The figures are based on actual delivery of Studebaker cars.

## Oakland Schedules 22,268

DETROIT, Feb. 1—Oakland Motor Car Co. has set a schedule of 22,268 cars for February production, this comparing with 19,774 in January.

## Flaherty Buys Interest

NEW CASTLE, PA., Feb. 1—P. J. Flaherty, president and general manager of the Johnson Bronze Co., has purchased the Johnson interests in the company. No change is contemplated in either operation or personnel.

## \$725,555,812 Tax Bill Paid by U. S. Owners

NEW YORK, Feb. 1—America's estimated total tax bill for motor vehicles during 1927 is \$725,555,812, according to the 1928 edition of the Motor Vehicle Conference Committee's bulletin on Special Taxation for Motor Vehicles.

This bulletin contains a discussion of the principles controlling special taxation for motor vehicles and an analysis of the state taxes and fees on motor vehicle operation in force Jan. 1 of this year.

## Hudson Offers Options on Wheels and Rumble Seats

CHICAGO, Jan. 30—The Hudson Motor Car Co. has announced that wire wheels and fender wells will be offered as optional equipment at extra cost on Hudson models. A trunk is also being included as standard equipment on the standard five-passenger sedan and on the landau sedan.

The company also announces a revision of price on the Essex and Hudson coupes involving an optional rumble seat at \$30 extra.

## Coddington Heads N.A.D.A.

CHICAGO, Feb. 1—Election of officers of the National Automobile Dealers Association here today resulted as follows: C. C. Coddington, Charlotte, N. C., president; Warren E. Griffith, Toledo, first vice-president; J. R. Histed, Chicago, second vice-president. Retiring directors were reelected and Dean Schooler, Des Moines, was elected a new member of the board.

## N.A.P.A. Sales Gain 19%

DETROIT, Jan. 28—All officers of the National Automotive Parts Association were reelected at the annual meeting here this week. D. Andrews, of Continental Motors Corp., was named as the new chairman of the manufacturers' advisory board. Sales of members' products in 1927 were 19 per cent larger than in 1926.

## Manville Board Cut to 9

NEW YORK, Feb. 2—Directors of Johns-Manville Corp. were reduced from 24 to 9 under a new policy by which department heads no longer are to be chosen directors. H. E. Manville was reelected chairman, the other directors named being F. D. Bartow and George Whitney of J. P. Morgan & Co., T. F. Manville, W. E. Seigle, T. F. Merseles and W. M. Aldridge.



## 1927 Export Sales Total \$406,007,984

All Previous Years Surpassed  
and 1926 Total Exceeded  
by \$86,549,827

WASHINGTON, Jan. 31—Automotive exports during 1927 surpassed all previous years, according to figures just announced by the automotive division of the U. S. Department of Commerce. Foreign sales last year totaled \$406,007,984 and represented a gain of \$86,549,827, or 20.3 per cent over 1926.

The average monthly export value of automotive equipment was \$33,833,999.

Commenting on the figures, the department points out that they establish a heretofore untouched total for exports of automotive products during any one year and is of even greater importance in view of the fact that production during the year declined 904,912 units from the total output of 1923.

The ratio of passenger car exports to production in December was 15.6 per cent. The unit value of passenger cars exported in December was \$869 and of trucks was \$794. Parts exported in December totaled \$7,504,961. Automotive imports for December totaled \$261,509, compared with \$282,464 worth of automotive equipment imported the previous month.

## Brake Systems Meet State Requirements

CHICAGO, Jan. 31—The possibility that any car except Ford will be refused registration because of illegal braking systems is now believed to be entirely eliminated, according to representatives of leading brake manufacturing companies.

D. K. Moore, sales manager of the Bendix Brake Co., declares that the question has been satisfactorily settled. The new law to be presented to 11 eastern legislatures as a result of the recent meeting of motor vehicle commissioners on this subject reads as follows:

"Every automobile shall be equipped with at least two braking systems with two separate means of application each operating on at least two wheels and each of which shall suffice to stop the vehicle within a proper distance. If these two systems are connected in any way, they shall be so constructed that the failure of any one part of the operating mechanism shall not leave the automobile without brakes on at least two wheels."

## Commercial Credit Corp. Reduces Repossessions

NEW YORK, Jan. 31—Commercial Credit Corp. reports net credit to undivided profits, after all charges, of \$780,777 for the year 1927. Motor lien retail time sales notes are listed at \$14,922,058, as compared with \$17,055,-

961 on December 31, 1926. Repossessed cars in the company's possession are listed at \$89,071, as compared with \$98,429 at the close of 1926. Total assets are given as \$27,342,876.

H. L. Wynegar, president, reports current earnings for 1927 as satisfactory and states that 1928 gives promise of being the best year in the history of the corporation.

## Dodge Brothers Net \$14,830,475 in 1927

NEW YORK, Feb. 1—Dodge Brothers, Inc., reports profits for 1927, after depreciation but before interest and provision for taxes, as \$14,830,475, equivalent to 3.9 times all interest charges for the year. This is equal, after interest and income taxes, to \$11.34 a share on the outstanding preferred stock. After payment of all charges and preferred stock dividends, balance was \$3,778,296, or the equivalent of \$1.55 a share on common stock. Earnings in 1926 were \$27,793,673.

Current assets are \$46,747,526 with current liabilities of \$15,453,286, a ratio of current assets to liabilities of 3.03 to 1. Current surplus was increased to a total of \$29,350,315. Combined sales of cars and trucks amounted to \$173,581,526 in value and totaled 205,260 units.

## Navy Buys 100 Engines from Wright Aeronautical

WASHINGTON, Jan. 31—A contract for 100 air-cooled aircraft engines and parts totaling \$1,141,912 was awarded this week by the Navy Department to the Wright Aeronautical Corp. The engines, all nine-cylinder, will be installed in the new PD planes now under construction by the Douglas company of Santa Monica, Cal., each plane being equipped with two engines.

Two other contracts were also awarded by the Navy Department, one to the Goodyear Tire & Rubber Co. at a cost of \$121,567, for eight gas cells for the "Los Angeles." The other contract was to the Hall Aluminum Aircraft Corp. of Buffalo for an all-metal amphibian plane, the cost of which will be \$71,000.

## Nagel-Saf-T-Stat Merge

TOLEDO, Feb. 1—The W. G. Nagel Electric Co., makers of ammeters, radio and automobile accessories, and the Safe-T-Stat Co., Brooklyn, have been merged, effective today, and all manufacturing operations will be centered here. It was announced that the Nagel plant had been sold to the Brooklyn corporation at a consideration of more than \$1,000,000, but in the merger the personnel of the Nagel organization will be retained. D. G. Nagel is president, Rug Martin, of the Brooklyn company, vice-president; Harry E. Adams, treasurer, and E. J. Walker, secretary.

## Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co.

NEW YORK, Feb. 2—Financial developments of the past week were overshadowed by the action last Tuesday of the Chicago Federal Reserve Bank in advancing its rediscount rate from 3½ to 4 per cent. A similar increase was made by the Richmond bank two days later. Reports of 30 railroads indicate a decrease in December net earnings of 27.7 per cent as compared with those in December, 1926. Operations in the steel industry continue to increase, the rate of output for the United States Steel Corp. last week being 82 per cent of capacity, as compared with 78 per cent a week earlier.

### FREIGHT CAR LOADINGS

Railroad freight car loadings in the week ended Jan. 14 increased, numbering 906,734, as compared with 754,062 in the previous week and 942,731 in the corresponding period last year.

### PETROLEUM OUTPUT

Production of crude petroleum rose slightly during the week ended Jan. 21, average daily output being 2,380,900 bbl. which compares with 2,373,100 bbl. a week earlier and 2,388,650 bbl. in the corresponding period a year ago.

### FISHER'S INDEX

Professor Fisher's index of wholesale commodity prices was fractionally lower last week at 95.6, as against 95.7 in the preceding week and 95.9 four weeks earlier.

### FEDERAL RESERVE REPORT

Bank debits to individual accounts, as reported to the Federal Reserve Board for the week ended Jan. 25, were 8.8 per cent below the level of the previous week but 12.4 per cent greater than the amount reported in the like period last year.

For the same interval the Federal Reserve banks reported that reserves increased \$12,500,000, while discounts declined \$26,800,000, open market purchases \$21,700,000, U. S. Government securities \$58,500,000, note circulation \$38,900,000 and deposits \$70,000,000. Member banks reported that in this period investments rose \$19,030,000, while loans and discounts decreased \$126,402,000, demand deposits \$175,969,000 and borrowings from the Federal Reserve banks \$30,033,000.

Time money rates were lower last week at 4 to 4½ per cent. Rates for commercial paper remained unchanged at 3¾ to 4¼ per cent.

## Introduces New Ring

BALTIMORE, Feb. 1—American Hammered Piston Ring Co. is introducing a new type of ventilated piston ring, characterized by large closely spaced slots through the center. Above and below these slots are annular grooves. The rings have four scraping edges to remove excess oil from the cylinder walls.

## Steel Prices Move Toward Higher Level

Increases Indicated for Second  
Quarter Bookings on Strip  
and Bars

NEW YORK, Feb. 2—While there is no mistaking the steel market's firmer tone, the extreme caution with which producers approach their avowed program of upward price revision, indicates that volume of demand needs further improvements. On new business for full finished automobile sheets, 4.15 cents, Pittsburgh, is being asked, an advance of \$3 a ton. Second-quarter orders for hot-rolled strip steel and for cold-finished steel bars are to carry a \$2 per ton increase; booking of second-quarter business in cold-rolled strip steel is to be an advance of \$3 per ton.

Automotive consumers are giving little thought at this time to their second-quarter requirements. While they have been specifying freely against contracts that carried prices more advantageous to them than those now current, and while these hints of higher second-quarter levels may accelerate the placing of business at going prices, automotive buyers show no disposition to anticipate their wants more so than they have been in the habit of doing.

Demand for full-finished automobile sheets has broadened. Producers of automotive alloy steels have booked some very gratifying orders, and a better demand is noted for the higher-priced chromium and nickel-chromium steels. Automotive buying is a feature of the tool-steel market.

**Pig Iron**—A moderate volume of demand from automotive foundries is noted. Prices hold their own. Some second-quarter business is under negotiation and quite a few foundries are ordering iron for immediate shipment.

**Aluminum**—Demand has grown more active and some automotive consumers have covered their wants for several months ahead. Most automotive consumers are disposed to buy conservatively, however, until their rates of operations have attained a more dependable basis. A good deal of metal is being withdrawn from bonded warehouses and shipped into consumption.

**Copper**—Domestic demand is not very brisk. In spite of the solidarity of American producers in the export market, London "bear" speculators continue to exert a certain amount of influence. Michigan and Connecticut brass mills have a fair quota of automotive orders. Prices show little change.

**Tin**—While automotive consumption of tin is on the uptrend, consumers are not disposed to take advantage of dips in the market, preferring to cover their requirements in routine fashion.

**Lead**—Storage battery makers have not been greatly interested in lead offerings in the last few days. The market rules fairly steady.

**Zinc**—Producers are extending support to the market pending improvement in consuming demand.

## Budd Wheels Exempt in Infringement Suit

PHILADELPHIA, Jan. 28—The following comment on the Cowles patent litigation was made today by a representative of the Budd Wheel Co.: "A most interesting feature of this litigation is the fact the Budd-Michelin demountable disk wheel construction employing studs and spherical nuts was very early excepted from infringement both by the complainants and by the court in its decree and that for two or three years past all Budd mountable wire wheels have been mounted in identically the same manner."

## Willys Adds Units to Build 1550 Daily

TOLEDO, Feb. 1—Several plant additions which together with equipment will mean an investment of \$1,000,000 have been contracted for by the Willys-Overland Co., to be completed in 60 days so that the plant here may reach a maximum of 1550 cars a day production. Officials said that several tight places found in the present rush of business were being relieved.

The company has approximately 20,000 unfilled orders on hand notwithstanding production of more than 800 cars a day in recent weeks, it was announced by George M. Graham, assistant to John N. Willys.

"February and March now shape up as the best months in the company's history," said Mr. Graham. "The February schedule calls for 25,000 cars and in March we shall make 35,000 to 40,000 cars. We are taking orders at the rate of 1000 cars a day."

## Take Allen Electric Name

KALAMAZOO, Jan. 30—G. H. Allen and H. H. Levene, who recently purchased the General Equipment Corp., have changed its name to the Allen Electric & Equipment Co. Factory and main offices will remain in Kalamazoo.

The present owners will continue to manufacture a complete line of automotive shop equipment, and to market their products exclusively through authorized jobber channels.

## McQuay-Norris Elects

ST. LOUIS, Jan. 28—Directors of McQuay-Norris Mfg. Co. elected this week are W. K. Norris, L. A. Safford, C. L. Derrickson, A. G. Drefs, A. J. Mummert, W. C. Winter and C. R. Kalb. Officers are W. K. Norris, president; C. L. Derrickson, vice-president; L. A. Safford, vice-president, and A. G. Drefs, secretary-treasurer.

## U.S. Seeks Action on Battery Standards

Federal Specification Board  
to Name Committee to  
Draft Revisions

WASHINGTON, Jan. 31—A preliminary conference for the purpose of revising the master specifications for automotive and radio storage batteries was held here this week. The meeting was called by the Federal Specification Board with the idea of appointing a special committee consisting of representatives of the Society of Automotive Engineers, the National Electrical Manufacturers Association, representatives of the government and leading battery manufacturers to draft a new set of specifications.

The exact personnel of the committee will be named at a later date. With an idea of getting the battery industry's reaction to a revised specification standard, a proposed set of specifications were sent to a large number of battery manufacturers.

Those attending the conference included representatives of the National Electrical Manufacturing Association, the Electric Storage Battery Co., the Philadelphia Storage Battery Co., Car-lile & Doughty, Prest-O-Lite Storage Battery Corp., U. S. L. Battery Corp., Willard Storage Battery Co., and Westinghouse Union Battery Co. In addition to these manufacturers, representatives of government departments were present from the Bureau of Standards, the National Committee on Wood Utilization, the engineering section of the motor transport division of the Quartermaster Corps, and the signal corps of the War Department, Bureau of Engineering, Navy Department, and the Department of Agriculture.

## Tasco Liquidates

CHICAGO, Jan. 31—One of Chicago's oldest and largest automotive equipment jobbers, the Automobile Supply Co., has sent out notices that it will liquidate as of Feb. 10 and retire from business. Familiarly known as "Tasco," its trade name, this company dates back to the early days of the industry. T. M. Brooks, president of the company, was one of the organizers of the Automotive Equipment Association and was its first president.

## Rubber Trading Quiet

NEW YORK, Jan. 30—Rubber trading was comparatively quiet at the beginning of last week, but showed some improvement toward the end of the week with 1662 lots, or 4155 tons, changing hands on Thursday and Friday at lower prices, according to Henderson, Helm & Co., though factory interest was rather limited. Arrivals in New York from Jan. 1 to Jan. 26 are estimated at 34,100 tons.



## Used Car Blessing, Grant Tells Dealers

Permits Doubled Sales He  
Says at Chicago—Reeves  
Shows Outlook Sound

CHICAGO, Jan. 28—The used car is a blessing to the automobile industry, said R. H. Grant, vice-president and general sales manager of Chevrolet Motor Co., at the banquet last night of the Chicago Automobile Trade Association. It was the eighth annual pre-show sales meeting of the association and besides Mr. Grant the speakers included Alfred Reeves, general manager of the National Automobile Chamber of Commerce; C. A. Vane, manager of the National Automobile Dealers' Association; C. C. Hanch, general manager of the National Association of Finance Companies; Harry G. Moock, managing director of Greater Market Development, Automotive Equipment Association, and M. L. Hemenway, of the Motor & Accessory Manufacturers' Association.

"We sell approximately 4,000,000 new cars each year and if it were not for the used car the industry would not sell more than 2,000,000," said Mr. Grant. "The average automobile built today will operate successfully for an approximate life of seven years but the public, thank God, gets tired of 'em in two.

"Every industry expects to make a limited return on its investment. The automotive industry is no exception. There has been a lot of agitation in an attempt to persuade the dealer that he must mark up his used cars so that both he and the salesman can make a profit from their sale. Isn't the margin of profit sufficient to give the dealer a fair return on his investment from the sale of new cars? If it is, and I believe it is, it is not necessary to make a profit on used cars. Mark them where you can make a fair profit on your entire business.

"If you don't move your used cars, you can't sell your new ones. Get together on your appraisals. Don't bid higher than you should to insure good profit. The salvation of the automobile industry is cooperation of the manufacturer, dealer and salesman and if we all pull together we can keep this 4,000,000 market.

"As a result of a partial let-up in manufacturing last year, there are today 500,000 buyers who have been hesitating but who will buy in 1928. The excellent economic condition combined with the unusual situation in the automotive industry presents a picture this year that is extraordinary."

Mr. Reeves gave 14 points in support of his belief that 1928 will be a good year for good workers. These he enumerated as follows:

The public wants to buy; the indus-

## California Takes 7% of 1927 Output

SAN FRANCISCO, Jan. 30—Approximately 200,000 of the motor cars and trucks produced in the United States in 1927 were sold and delivered in California. Their wholesale value was a little better than \$125,000,000, and they formed almost 7 per cent of the 3,530,000 cars and trucks built in this country during the year. These figures are given out by the California State Automobile Association, which adds that the average retail price of new passenger cars in California in 1927 was \$953.

try offers its best products at its lowest prices; the national shows have proved that public interest is at its highest point; increasing exports are keeping the factories busy when domestic sales are at a low ebb, thus keeping prices low; Ford's reentry has helped the business inestimably; election won't hurt business; all candidates are conservative; labor is steadily employed; the renewal market is growing; two car families are increasing; money is easy and the rediscount rate is low; farm purchasing power is high; inventories are low; there is no inflation of the stock market, and the wealth of the United States is increasing.

Mr. Vane was inclined to the belief that 1928 will be a great year—for the customer. He urged that dealers and salesmen inventory themselves and not the industry and asked what difference volume made if it is all prosperity and no profit.

## Chandler Raises Price on Four Big Six Models

CHICAGO, Jan. 28—Somewhat higher prices on several of the Chandler Big Six models were in effect at the show. The list follows:

	New	Old	Advance
Touring .....	\$1,725	\$1,695	\$ 30
Metro. sedan ...	1,525	1,525	..
Coupe .....	1,725	1,675	50
Country club ...	1,725	1,675	50
De luxe sedan ..	1,925	1,795	130
Royal sedan ....	1,725	1,725	..

## Oshkosh Parts Buys Plant

OSHKOSH, WIS., Jan. 30—The Oshkosh Auto Parts Co. has acquired the plant of the J. A. Barnes Machine Co. and will occupy it as an additional plant and warehouse after making alterations. The Barnes company, established forty-seven years ago, has purchased a new site at the north limits of Oshkosh and will start work at once on the erection of a new plant.

## Studebaker Outlines Merchandising Aim

Used Car Session One of High  
Spots at Sales Management  
Conference

SOUTH BEND, Jan. 28—All parts of the country were represented by dealers and sales managers at a three-days' conference on sales management at the Studebaker factory, ending today with the embarkation of the entire gathering for the Chicago Automobile Show.

The meeting was opened on Wednesday at the Oliver Hotel. James M. Cleary, sales manager, welcomed the delegates with a dispassionate talk on "Now It's Up to the Sales Department." Harold S. Vance, vice-president in charge of engineering and production, threw the spotlight on those important departments of the organization. Other first-day speakers were William S. James, chief research engineer; E. J. Murnane, manager New York retail branch; Dr. James H. Greene, director of the Research Bureau for Retail Training, University of Pittsburgh, and David Rosenblum, vice-president Business Training Corporation, New York City. Mr. Mulick, manager of western branches, presided.

Trips through the body plants and engineering research laboratories, and to the proving grounds on Thursday preceded the dinner meeting in the evening. John Cleary, editor of MOTOR AGE, drew a picture of present competition outside the industry, indicating the need of less talk and more action on the subject of intensified retail salesmanship.

## Visit Plant Departments

The Friday program opened up with a trip through the foundry, forge, stamping, machine shop and final assembly. In the afternoon A. J. Chanter, purchasing agent, presided at a meeting which was addressed by Charles H. Wondries, manager of the commercial car division, and J. L. Engels, sales promotion manager of the commercial car division, on Commercial Car Opportunities for 1928; M. F. Rigby, advertising manager, and J. P. Roche, president Roche Advertising Company, on Tying Sales up with Advertising; and Leslie Williams, manager of the systems division of sales department, on Business Management.

There was a discussion in the evening on What the Used Car Pledge Has Meant to Me, led by H. D. Schleeter, Houston, Texas, distributor, and Jack Morgan, special representative central-southern district. I. L. Funston, used car manager of the South Bend retail branch, talked on Getting Used Cars Ready to Move. The meeting ended with an address, Going After Used Car Business, by Paul G. Hoffman, sales manager, who presided.

## Men of the Industry and What They Are Doing

### Spicer Heads Asbestos Brake Lining Association

J. T. Spicer, general manager of automotive equipment business for Johns-Manville Corp., was elected president of the Asbestos Brake Lining Association at its annual meeting held in New York this week.

Mr. Spicer expects to lead the association in active campaigns to make driving safe, to reduce the number of accidents and to secure uniform national traffic regulations. Assistance in this program is expected from an expert technical committee, consisting of engineers from a number of the member companies.

It is estimated that 75,000,000 ft. of asbestos brake lining will be required in new cars during this year, if the optimistic figure of 5,000,000 production is realized. Taking into consideration replacement on cars already in use, and clutch linings, it is estimated that between 125,000,000 and 150,000,000 ft. will be used altogether.

### Rockenfield Joins High Speed

William A. Rockenfield, former general manager of the Baldwin Chain & Mfg. Co., Worcester, Mass., and identified with other manufacturing projects in a consulting capacity, is now associated with the High Speed Hammer Co., Inc., of Rochester, N. Y., in the capacity of vice-president. He will devote his time to engineering and sales.

### Mogge Opens Agency

Arthur R. Mogge, formerly with Greater Market Development, Automotive Equipment Association, has announced the opening on February 1 of an advertising agency in Chicago rendering counsel and service in merchandising, advertising and sales promotion.

### Upton Joins Apollo

Frederick P. Upton has resigned as vice-president of the Splitdorf Electrical Co. to become vice-president of the Apollo Magneto Corp. of Kingston, N. Y. Mr. Upton was connected with Splitdorf for 15 years.

### Long to Address Students

John C. Long, manager of the educational department of the National Automobile Chamber of Commerce, will address the students at Rutgers University on Feb. 9, on the future of motor transportation.

### Glenny Regional Manager

E. F. Glenny has been appointed manager of the Atlantic region of Olds Motor Works with offices in New York City. Frank J. Ackerman has been appointed manager of the Oldsmobile branch in Cleveland.

### Lawrance is Awarded 1927 Collier Trophy

The Collier trophy for 1927 has been awarded to Charles L. Lawrance, president of Wright Aeronautical Corp., for his outstanding work in the development of the air-cooled engine which figured so prominently in last year's trans-oceanic flights. The award was made by the National Aeronautic Association.

The trophy, donated by the late R. J. Collier, is awarded for the "greatest achievement in aviation in America, the value of which has been demonstrated by actual use during the preceding year."

### Clingan Joins New Departure

Robert E. Clingan, formerly president and general manager of the Bock Bearing Co., which was absorbed by the Timken Roller Bearing Co., has joined the New Departure Mfg. Co., Bristol, Conn., in an executive capacity.

### Thien on Southern Trip

Robert R. Thien, manager of the advertising division of General Motors Export Co., is sailing Feb. 14 for South America to make a tour of the region. He will return to New York about May 1. C. T. Coleman, manager of the bus and truck division, is sailing Feb. 9 for Europe.

### Stiles Joins Seth Thomas

Charles T. Stiles, who has been making a merchandising survey for the Seth Thomas electric automobile clock, has joined the Seth Thomas Clock Co. to handle the sales marketing of this new department.

### Ruth Now With Ramco

J. E. "Babe" Ruth has resigned as sales manager of Diamond Piston Ring Co. and is now in charge of Eastern sales of the Ramsey Accessories Mfg. Co., manufacturers of Ramco inner rings and seal flex piston rings.

### Gascoigne Joins American

G. N. Gascoigne, formerly assistant sales manager of the General Equipment Co., Kalamazoo, is now general manager of the American Appliance Co., succeeding J. L. Brownell.

### Bradfield Leaves Yellow

H. C. Bradfield has resigned as director of advertising of Yellow Truck & Coach Mfg. Co.

### Pratt & Lambert Elects Officers and Directors

At the semi-annual meeting of the board of directors of Pratt & Lambert, Inc., held in Buffalo, the following officers were reelected: J. N. Welter, Chicago, chairman of the board; A. D. Graves, Buffalo, president; H. E. Webster, Buffalo, senior vice-president and secretary; J. P. Gowing, Chicago, vice-president; F. W. Robinson, Buffalo, vice-president.

W. P. Werheim, of Buffalo, was elected vice-president, and R. W. Lindsay, also of Buffalo, treasurer.

Walter P. Cooke of Kenefick, Cooke, Mitchell & Bass, Buffalo, was made a member of the board of directors, and C. D. Sproule, resident manager of Pratt & Lambert, Inc., at Chicago, was also elected to the board.

### Detroit Boosters Hear Lewis

"Research as Applied to Sales" was the topic of E. St. Elmo Lewis, addressing the Automotive Boosters Club No. 19 of Detroit, at their monthly meeting in Hotel Savoy. In the evening the club held a party which was attended by 200 Boosters and their friends. The club has outlined a comprehensive program for the winter months and monthly meetings will be held the first Saturday afternoon of each month at the Hotel Savoy.

### Joins Heil Company

Walter J. Wachowitz, formerly president of the Manitowoc (Wis.) Plating Works, and more recently operating the Wacho Mfg. Co., Milwaukee, has joined the Heil Co., Milwaukee, as dairy equipment expert. Mr. Wachowitz has developed a stainless steel which is being used for the manufacture of milk tank equipment for motor trucks.

### MacFarland With Lincoln

A. M. MacFarland has been retained by Lincoln Electric Co. as general sales and development engineer. He will devote his attention to the development and special application of automatic carbon arc welding, with headquarters in Cleveland.

### Davis Coast Manager

Harry H. Davis has been appointed west coast factory manager for the United States Air Compressor Co. Mr. Davis will have his headquarters in San Francisco where the company has established an office and warehouse to facilitate shipments.

### Harvey Joins Stearns

Establishment of a sales promotion division headed by L. H. Harvey is announced by L. E. Corcoran, general sales manager of the F. B. Stearns Co., Cleveland.



## Large Buying Seen in Wake of Shows

### Increased Number of Prospects Enrolled Expected to Bring Large Sales Volume

MILWAUKEE, Jan. 28—Official figures verify earlier predictions that the twentieth annual Milwaukee show broke all previous records for attendance. Paid admissions for the eight days numbered 105,802, and the turnstiles clicked off a total of 119,406 admissions, including courtesies. The previous record for paid admissions established at the 1927 show was exceeded by nearly 14,000. The paid attendance on the final day, 21,480, set a new high record for one day.

While the exhibitors, of course, were extremely gratified over the interest manifested, they found it impossible at times to do any business because of the great jam. Results, however, were satisfactory, and while no sales figures have been issued, an increase averaging 16 per cent is indicated.

### Baltimore Enrolls Prospects

BALTIMORE, Feb. 1—Armed with a record-breaking list of prospects, Baltimore automobile dealers have launched into an energetic selling campaign. The recent show broke all previous attendance records and gave the dealers a good insight into how the public feels about motor cars. As a result they are going after the business harder than ever.

### Rochester Sees New Record

ROCHESTER, Jan. 28—Rochester's twentieth annual automobile show bigger and better than ever. Three large buildings housed the exhibits, which included 35 makes of passenger cars, six of trucks and 19 accessory displays. Early reports indicated that the show would break all attendance records. Ideal weather prevailed.

### Pittsburgh Has 37% Gain

PITTSBURGH, Jan. 29—The Pittsburgh automobile show this year broke all attendance records. For the first four days a 37 per cent increase was marked up over last year. Exhibitors are emphatic in their declarations that the show this year is the best buying show ever held in Pittsburgh.

### Scranton Show Biggest Ever

SCRANTON, Jan. 30—Scranton twentieth annual automobile show this year biggest and best ever held in this city. Attendance record shattered even in case of paid admissions.

### Newark Gain 12 to 15%

NEWARK, Jan. 28—An outstanding development of the Newark Automobile Show which closed last Saturday

was the unusual number of "clean" sales made on the floor of the show. Dealers are agreed that interest of a substantial nature was very much in evidence at this show. Although final figures are not yet available the attendance was known to have broken all previous records.

### Nash Sells 170 in New York

KENOSHA, Jan. 28—Sales figures for the New York show just compiled and given out by the Nash Motors Co., show 170 cars bearing the Nash nameplate were purchased. Every indication, according to Nash officials, points to a continuance of heavy business at the local shows.

### Atlantic City Sells 200

PHILADELPHIA, Jan. 30—Atlantic City's twelfth annual automobile show closed Saturday after a record week, with about 35,000 visitors and an estimate of 200 cars sold. There were 27 dealers exhibiting at this show.

## H. H. McCarty Dies Following Accident

CLEVELAND, Jan. 30—H. H. McCarty, sales manager for the Aluminum Co. of America died Jan. 29 after an automobile accident while driving from Detroit to Cleveland. Mr. McCarty was actively associated with Mr. Midgley of General Motors Corp. in the development of Ethyl gasoline. He also occupied a position on the faculty of Purdue University in the department of practical mechanics and gas engine design.

His connection with the Aluminum Co. of America dated from February, 1926, when he accepted the position of sales engineer in the Detroit district.

He was single and is survived by his father, mother and two brothers. Funeral services were held at the home of his parents in Lafayette, Indiana.

## Markel Leaves McKinnon, Dunn Named Treasurer

COLUMBUS, Jan. 31—Announcement is made by the Columbus-McKinnon Chain Co., that A. R. Markel, formerly treasurer and general manager of the company, has resigned. Joseph C. Dunn is now secretary and treasurer of the company and has moved his headquarters from Columbus to Tonawanda, N. Y.

The Columbus plant, which produces about 25 per cent of the company's product, will be operated by A. R. Smith. Don S. Brisbin, sales manager, has moved his offices to Tonawanda.

## Samuel P. Gould

ROCHESTER, Jan. 28—Samuel P. Gould, assistant secretary of Selden Truck Corp., died this week at his home in this city.

## Financial Notes

Packard Motor Car Co. reports net profit for the last four months of 1927 of \$6,810,904 after depreciation and Federal taxes, as compared with \$4,849,540 for the same period of 1926. This is equivalent to \$2.27 a share as against \$1.61 a share a year ago. Net profit for December was \$1,277,636 as against \$1,014,065 a year ago and constitutes the best December in the company's history. Dividends of 25 cents a share were declared on three issues of stock, payable March 31, April 30 and May 31, to stockholders of record March 15, April 15 and May 15, respectively.

E. I. du Pont de Nemours & Co., Inc., reports net income for 1927 of \$41,113,968, or \$15.45 a share, applicable to no par outstanding common stock, as compared with \$37,119,164, or \$13.98 a share in 1926. The financial statement shows earnings from equity in General Motors investment of \$28,941,597 as compared with \$23,621,946 for 1926. Total gross assets amount to \$351,440,262, of which investment in General Motors stock and controlled companies aggregate \$175,726,737.

Gabriel Snubber Mfg. Co. reports net profits of \$960,330 or \$4.80 a share on the 200,000 shares of combined A and B stock, for the year 1927. This compares with \$1,033,630 in 1926. Assets show an increase of \$210,280 over 1926 and surplus account increased by \$260,330. During 1927 the company replaced all obsolete products on dealers' shelves with improved products.

B. F. Goodrich Rubber Co., in a preliminary statement for 1927, showed net profit of \$11,700,000 after taxes, depreciation and other charges, as against a net profit of \$5,065,110 in 1926. Net sales were in excess of \$151,000,000, the largest year on record. Earnings in 1927 equaled \$15.36 a share available to common stock as against \$4.64 a share earned in 1926.

Marvel Carburetor Co. shows net earnings for 1927 of \$600,984 after charges and Federal taxes, equal to \$8 a share, according to a preliminary statement just issued. No comparison of earnings is available on account of recapitalization of the company in May, 1927. Current assets at the close of 1927 were \$1,007,320 and current liabilities \$146,858.

Gardner Motor Co., Inc., has been granted right to list 45,000 shares of additional capital stock on the New York Stock Exchange. In its application for listing, the company revealed that it had contracted to sell that amount of stock at not less than \$8 a share to obtain funds for general corporate purposes.

Pines Winterfront Co. reports net income for 1927 of \$404,211, or \$4.04 a share, on combined Class A and B shares, as against \$349,169, or \$3.49 a share, in 1926. Current assets were \$1,255,944 with current liabilities of \$245,754. Total assets were \$1,935,077.

Pratt & Lambert, Inc., reports net earnings of \$1,325,656, equivalent to \$6.55 a share, in 1927. This is approximately the same as for the past two years. Surplus account after providing for dividends has been increased \$515,656.

# Sales Show Gains in Many Centers

(Continued from page 174)

coming into the market more strongly, and the Southeast and the Central West upholding recent good business. The industrial centers of the Middle West also report better business, due to improved conditions within the industry itself.

Reports from leading centers follow:

## BOSTON

Apparently the tide in motor car sales has turned. An executive for one of the lower priced cars says that his allotment for January and February is all sold now, and he is holding off asking for March orders from dealers. One distributor in the field covering between \$1,000 and \$3,000 shows figures that to Jan. 15 sales were greater than all of Jan., 1927; another in the same class tells how up to Jan. 20 his local retail sales were more than 100 per cent above the same period last year, and his wholesale 80 per cent greater.

## NEW YORK

New car sales have been a trifle more than seasonally low during the current month, although dealers generally feel the basis of business to be sound and the number of prospects to compare favorably with previous years. New car stocks generally are rather light. Carry-over stocks of new 1927 models have not been heavy but efforts on the part of dealers to dispose of these stocks have had a marked influence on the market.

## ATLANTA

Lower prices with a substantial reduction in freight rates on automobiles shipped to Atlanta is having a favorable effect on motor car sales, especially cars in the lower-priced class. The outlook for the first half of the year promises the largest sales volume in the Southeast in the history of the automobile business in this district. At the same time, however, the used car market is adversely affected by lower new car prices. Truck sales continued active in January.

## CLEVELAND

New car sales for January will establish a new winter record. Sales at the Cleveland Automobile show will total \$2,000,000, it is believed. The spurt in new car sales had been accompanied by signs of life in the used car market, where prices have been trimmed to the bone to conform with new car values.

## NEW ORLEANS

Expect delivery of new Fords to begin here next week from local assembly plant. Sale of all new models except Ford has proved disappointing. It is believed delivery of new Fords will stimulate trade in general. Used car market in very bad condition. Improvement in trade expected in next 30 days.

## DALLAS

With new models and lower prices prevailing automotive business during the first month of the year is normal with the outlook decidedly improved. The low price of many models served to increase used car stocks. Prices of used cars have been reduced until they can be bought for "song and a dance."

## CHICAGO

A rapid recovery from the lethargy evidenced by the automobile industry during December is shown in the record of January business. Almost every new car dealer reports business in January as the best in years. It is estimated January sales are approximately 25 per cent in excess of December and about 10 per cent better than January a year ago. Although the volume of new car sales has been large there appears to be little more than normal stocking of used cars.

## MILWAUKEE

Encouraged by the fact that the 1928 Milwaukee show drew a record-breaking gate of 105,802 paid admissions; that more retail sales were made on the show floor than ever before, and post-show interest has been exceedingly well sustained, Milwaukee dealers look for a relatively excellent February business. January sales are fully equal to a year ago, at which time Ford still was a big factor in the total. Expectancy of further readjustment of passenger car selling prices undoubtedly is keeping some sales in suspense. The continued delay in deliveries of the Model A Ford to the public is exasperating some buyers to the point of purchasing other makes.

## KANSAS CITY

New cars sales have been at a high point with many dealers breaking all January records. The unusual number of new models on the market has stimulated interest and virtually all dealers, especially in the middle price field, are reporting heavy sales. There seems to be some dropping off in interest in the new Ford, due to the fact dealers are unable to promise delivery before August. There has been a slowing up on used car sales, but there is less tendency to pay more than used cars are worth. There are fewer used cars in the hands of dealers than is usual at this season.

## ST. LOUIS

Sales of new cars during January were satisfactory in all lines and with the show here next month it is expected that spring buying will get into full swing. Prospective purchasers are no longer waiting to see the new Ford and dealers in higher priced lines are benefiting. The used car situation is good. Stocks are not mounting even with the increases in new car sales and used cars themselves are moving well.

## CINCINNATI

January proved a disappointment to Cincinnati motor car dealers. A perceptible slump in new car sales as compared with January a year ago is attributed to efforts of certain manufacturers to persuade the public to hold off buying until their new cars were in the market. Leaders are hopeful that buying will be resumed quickly, now that the national and local shows are over.

## DETROIT

Automobile dealers are confident of excellent business during the spring months. The annual Detroit show attracted the largest crowds in history and dealers report the filing of large numbers of orders for new cars for spring delivery. Reports from up-state also indicate a quickening demand for automobiles.

## MINNEAPOLIS

The used car is the plug in the outlet of new cars in the Ninth Federal Reserve District centering in the Twin Cities. The market for used cars is light yet most of the prospects for new cars want to trade in on the price of the new cars. The advent of the low priced new cars for 1928 has not helped the situation.

## DENVER

Conditions continue at about the same level as for the preceding month. The dropping of car prices is having its natural effect upon buying. The fact that Ford will not be in production for some time and that no guarantee can be made on deliveries, is bringing good volume of orders for other cars in the same class. On the whole, business is still slow in Colorado. Truck sales are about over on light trucks till next crop time, and heavy trucks never are extra good in this territory.

## SEATTLE

Retail sales of the Pacific Northwest were somewhat disturbed the first part of January by new models and lower prices but the last part of the month showed sales ahead of January of last year. It is evident, however, that some of the much talked of new cars are going to cut into some of the lines just a little higher priced. Dealers expect that at least 20 per cent more cars will be sold in the first six months of 1928 than in 1927. Used cars are stacking up but the used car situation is expected to adjust itself at slightly higher levels, perhaps, within the next 90 days.

## SAN FRANCISCO

January sales will be little above those of the same month last year. The buying public is waiting, first, for the annual show, and second, for passage of tax day in March. While orders for Fords have been larger than in any month for the past year, few or no deliveries have been made and the increase will not show on January registrations. The new Ford has had little or no effect on other car sales in this territory. New models and reduced prices have been hard blows to the used car market.

## LOS ANGELES

Satisfactory increase is reported in January sales over December, but the total will fall under January, last year. Distributors report price slashing served to hold off about as many customers as it has induced to buy on belief still lower prices may develop. However, new models are attracting wide interest and good volume of orders are being taken. Used car stocks show slight increase. Improvement is noted in truck market and is expected to continue. General business conditions moderately good.



## Railways Complete Transport Division

### Will Study Application of Bus, Truck and Rail Car to Steam Lines

CHICAGO, Jan. 28—The newly authorized Motor Transport Division of the American Railway Association perfected its organization at its first meeting held here this week at the Palmer House, with the election of officers and a general committee to serve until October, 1929. The meeting was attended by 90 delegates representing more than 70 of the principal railroads in the United States and Canada.

The object of the Motor Transport Division is to establish a clearing house for transportation thought and development of motor transportation by railroads, and for studying the problem raised by highway competition in order to determine the facts and fundamental principles involved. To accomplish this purpose, studies and reports of the division shall be made on such territory, with its specific problems and its methods for meeting them, as the needs or desires of the member roads shall indicate.

The Motor Transport Division is organized in three sections dealing, respectively, with the study of the application of the motor coach, the motor truck and the rail motor car to the use of steam railroads. The importance of this general field and its international interest was evidenced by the statement made at the meeting that delegates from England, Japan, Australia and Germany have already visited this country to investigate American railroad activity in the field of motor transportation, while inquiries have been received from railroads in Chile, Switzerland, Sweden, Japan, Cuba, Australia and England regarding the motor transport problems confronting the American lines and the methods by which these problems are being met.

#### Russell Named Chairman

The following officers were elected: A. P. Russell, vice-president, New York, New Haven & Hartford, chairman; T. B. Wilson, vice-president and manager, Southern Pacific Motor Transport Co., vice-chairman; G. C. Woodruff, assistant freight traffic manager, New York Central, vice-chairman; G. M. Campbell, assistant to secretary, American Railway Association, secretary. R. L. Fairbairn, passenger service manager, Canadian National Railways, was elected vice-chairman in charge of the rail motor car section.

In addition to the foregoing officers, the organization includes a general committee, which will exercise supervision over the interests and affairs of the Motor Transport Division. The chairman and the vice-chairman are ex-officio members of this general com-

mittee, and the other members are: J. G. Drew, vice-president, Missouri Pacific; H. F. Fritch, passenger traffic manager, Boston & Maine; A. Hatton, general superintendent of transportation, Canadian Pacific; C. S. Lake, special assistant to president, Chesapeake & Ohio; G. W. Lupton, assistant to vice-president, Atchison, Topeka & Santa Fe; R. K. Stackhouse, general superintendent stations, transfers and motor service, Pennsylvania; R. N. Van Doren, vice-president and general counsel, Chicago & Northwestern.

The next meeting of the division will be held at Atlantic City, June 21 and 22.

## New Electric Delivery Has Radius of 70 Miles

NEW YORK, Jan. 28—The New York Edison Co. has made delivery of six electric delivery trucks which have a speed of 18 miles an hour and will travel 70 miles to a single charge and are expected to cover 45 to 50 miles a day. The storage batteries consist of 40 cells of the Edison A 6 type batteries under the hood and 24 more under the body just back of the rear axle. They are thus distributed to balance the front and rear and make for better traction.

The trucks have headlights, radiator fronts and hoods similar in appearance to those of gasoline driven automobiles and have wire wheels. Wheelbase length is 128 in. and with overall length of 183 in. The bodies are built by the Elysee Corp., Hagerstown, Md., and the chassis by Walker Vehicle Co., of New York.

## Gates Moves Branch

NEW YORK, Jan. 28—Gates Rubber Co. has moved its eastern branch from Jersey City to Hoboken. This new warehouse has improved rail and water facilities, more space and is expected to result in more efficient service.

## Question of Aviation Effect on Traffic.

### Rises at Congress Hearing on Highways

NEW YORK, Jan. 28—A. J. Brosseau, vice-president of the National Automobile Chamber of Commerce, spoke before the House roads committee in Washington this week, urging the continuance of the program of Federal aid for highways.

"With more than 23,000,000 vehicles in use today, additional millions being produced annually and considering the increased use of the vehicles on the roads as facilities increase, it is vital, we believe, to maintain the present scale of improvement," Mr. Brosseau said.

"For the future, we must look to grade separations, by-passing, building of parallel roads and similar measures to keep the system abreast of traffic demands. These measures are necessary even now in some states at the same time that initial improvement of the Federal system is only beginning in other places."

## G.M. Export Depicts Activities Abroad

### Motion Picture Film Shows Developments in 104 Foreign Markets

NEW YORK, Jan. 28—Preview of a film entitled General Motors Around the World, depicting the worldwide activities of General Motors Export Co., was given this week aboard the S. S. Aquitania to bankers, exporters, consular bodies and newspaper editors.

This film was prepared by J. D. Mooney, president, to submit with his annual report, so that directors of General Motors Corp. might have a clearer understanding of what the export company is doing in its 104 foreign markets.

In the absence of Mr. Mooney, W. T. Whalen, vice-president and general manager, acted as host, and he was assisted in presentation by Harry Tipper, sales manager of the export company.

The film shows the extent of the foreign activities of the company in the establishment of automobile assembly plants and warehouses in the various foreign countries. It also presents the economic development in a number of countries which has been made possible by the introduction of the automobile and improved highways.

By means of a series of superimposed maps, a distinct picture is given of the size of the different foreign markets. One fact emphasized in the showing of the foreign plants of the company is the maintenance of the national individuality of each company. Operatives in the various plants in the several different countries are usually native, and generally are supervised by natives.

Asked if the "flivver plane" would not relieve traffic congestion on the highways, Mr. Brosseau expressed an opinion that airplanes, even of the flivver type, were far too expensive and that it would be many years before this type of transportation would affect traffic congestion, if ever. He pointed out that the owner of an airplane would undoubtedly be also the owner of one or more automobiles and therefore that the air traffic would not relieve motor traffic to any great extent.

Governor Frank C. Emerson, of Wyoming, appeared before the committee in favor of the bill, declaring that further appropriations for Federal-aid highway construction and additional funds for road work within public lands of the Western States were imperative. Representative Walton Moore and P. T. Peterson, representing the Western Association of Highway Officials, also urged its adoption.

## Battery Association to Meet in Chicago

NEW YORK, Jan. 28—National Battery Manufacturers Association will hold its winter meeting at the Edgewater Beach Hotel, Chicago, Feb. 23 and 24. Alvin E. Dodd of the United States Chamber of Commerce, E. L. Green of the National Better Business Bureau, and George Woodruff of the National Bank of the Republic of Chicago, will be the principal speakers at this meeting. The rest of the program will be devoted to general and technical subjects pertaining to the battery industry, including suggested revision of storage battery specifications, a book of specifications for the industry, constructive merchandising ideas, freight classifications, a plan for cooperative advertising and the excise tax situation.

Elaborate entertainment is planned for the evenings of the two days of the meeting, and a tour of the Richardson Container Co. plant is scheduled for Friday.

## Approve Three Devices

MILWAUKEE, Jan. 30—Under a new law effective Jan. 1, permitting the application of reflective signals in lieu of a tail light on all trucks, tractors, trailers or semi-trailers not electrically equipped, when operated on any highway in Wisconsin, the state industrial commission has officially approved the following three types as meeting the technical standards of the law: Stimsonite, manufactured by the Stimson Reflector Co., St. Louis; Persons Vehicle Reflector, Persons-Majestic Co., Worcester, Mass., and Reflecto, U. S. Signal Corporation, Seattle, Wash. Besides the three types already approved, others are under test.

## Coming Feature Issue of Chilton Class Jour- nal Publications

Feb. 18—Statistical Issue—  
Automotive Industries.

## School Principal Wins Highway Safety Award

DENVER, COLO., Jan. 28—Prof. F. A. Boggess, principal of the Boulder High School, has been awarded first prize of \$500 in a nation-wide highway safety contest conducted by the American Road Builders' Association. Last year Professor Boggess conceived and put into operation a plan of sending letters to parents setting forth his aims and asking their cooperation. The students were given a talk on safety, asked to sign a pledge to observe caution on the streets and to extend courtesy to motorists. Plays were given before students and parents pointing out the high mortality as the result of carelessness and selfishness on part of both drivers and pedestrians, and finally mass meetings were held and addressed by the chief of police, district attorney and traffic officers.

## Start Los Andes Highway

NEW YORK, Jan. 28—Construction work on the international highway from Los Andes to Cumbre on the border between Argentine and Chile has been started, according to the National Automobile Chamber of Commerce. The Argentine Government has appropriated the necessary funds to unite this road with Mendoza, so that it will soon be possible to go by automobile from Santiago to Mendoza in 10 hours. This trip by railway takes 18 hours and costs approximately \$125.

## Lower Freight Rates Aid Southern Buyers

ATLANTA, Jan. 31—Automobile distributors and factory branches in Atlanta will save approximately \$150,000 per year in freight rates on automobiles from Detroit alone as a result of the new freight rates which went into effect Jan. 15, according to a survey of the effect the new rates will have in this territory made by Harry T. Moore, traffic manager of the Atlanta Freight Bureau.

Affecting carload shipments only, the new rates are 10 per cent less from Detroit to Atlanta for sixth-class freight, and range up to 38 per cent less on first-class freight, compared with the former rates, with proportionate reductions from other shipping points.

The delivery cost of motor cars and trucks to the buyer is expected to be substantially lessened by this freight rate reduction so far as sales by Atlanta distributors are concerned, which is expected to aid sales.

## To Make Roe Plane Here

SPOKANE, Jan. 30—The United States Aircraft Co., capitalized at \$100,000, has been formed here to manufacture the Avro Avian airplane, product of A. V. Roe & Co., a British firm. H. J. Taplin, vice-president of the new company, announces that the contract with the Roe company provides for the manufacture here of 25 planes the first year and 50 the following year. The engine will be built at the shops of the Washington Machinery & Supply Co. here. American material will be used for the planes exclusively, Mr. Taplin says. The ships will sell for from \$1,800 to \$2,000. The engines will be 4-cylinder air-cooled with gas consumption of 4 to 4½ gallons an hour.

# Calendar of Coming Events

## SHOWS

All Western Road Show, Los Angeles, March 7-11  
American Electric Railway Ass'n., Public Auditorium, Cleveland...Sept. 22-28  
Automotive Equipment Association, Coliseum, Chicago...Oct. 22-27  
Berlin...Nov. 8-18  
\*Boston, Mechanics Bldg...March 10-17  
Brussels...Dec. 8-19  
Copenhagen...Feb. 23-March 4  
Geneva...March 16-25  
Helsingfors, Finland...Feb. 19-26  
International Aircraft Show, Berlin, March 23-April 11  
Laybach, Yugoslavia...June 2-11  
Leipzig, trucks only...March 4-14  
London, passenger cars...Oct. 11-20  
Paris...Oct. 4-14  
Prague...Sept. 1-9  
Rio de Janeiro...May 3-13  
Salon, Automobile Salon, Inc., Hotel Biltmore, Los Angeles...Feb. 11-18  
Salon, Automobile Salon, Inc., Palace Hotel, San Francisco...Feb. 25-March 3  
United States Good Roads Show, Des Moines...May 28-June 1  
Zagreb, Yugoslavia...April 29-May 6  
\* Will have special shop equipment exhibit.

## CONVENTIONS

American Electric Railway Ass'n., Public Auditorium, Cleveland...Sept. 22-28  
American Welding Society, Engineers Society Bldg., New York...April 25-27  
Automotive Equipment Association, Grand Hotel, Mackinac Island, June 10-16  
Automotive Equipment Association, Coliseum, Chicago...Oct. 22-27  
Highway Engineering Conference, University of Michigan, Ann Arbor, Feb. 14-17  
National Battery Mfrs. Ass'n., Chicago...Feb. 15-16  
National Foreign Trade Council, Houston, Texas...April 25-27  
National Safety Council, National Congress, New York...Oct. 1-5  
United States Good Roads Association and Bankhead National Highway Association, Des Moines...May 28-June 1

## S.A.E. NATIONAL

Quebec, June 26-29—Summer Meeting, Chateau Frontenac.

## SECTIONAL

Buffalo, Feb. 7—Starters for Aircraft Engines—Raymond P. Lansing.  
Chicago, Feb. 14—New Developments in Automotive Design—Prof. D. A. Fales.

Cleveland, Feb. 13—Generation of Electric Current for Automotive Apparatus—B. M. Leece.  
Detroit, Feb. 13—Production of Automobile Frames by Automatic Machinery—John J. Kelley.  
Indiana, Feb. 9—General Progress Meeting. Meeting in charge of F. F. Chandler.  
Metropolitan, Feb. 16—Specialized Service.  
New England, Feb. 8—Brake Testing and Recent Brake Developments—A. Vance Howe, Charles F. Smith and F. W. Parks.  
Pennsylvania, Feb. 14—Generators and Motors for Gas-Electric Drive—C. A. Atwell.  
South California, Feb. 10—Brakes, Brake Wear, Brake Adjustment and Brake Testing—John H. Watrous and J. E. Van Sant.

## RACES

Atlantic City...May 5  
Belgium...Aug. 12  
Daytona Beach, Fla., series of stock car races and world's speed trials, Feb. 15-23  
Detroit...June 3  
Germany...July 15  
Great Britain...Sept. 22  
Indianapolis...May 30  
Italy...Sept. 2  
Spain...July 29